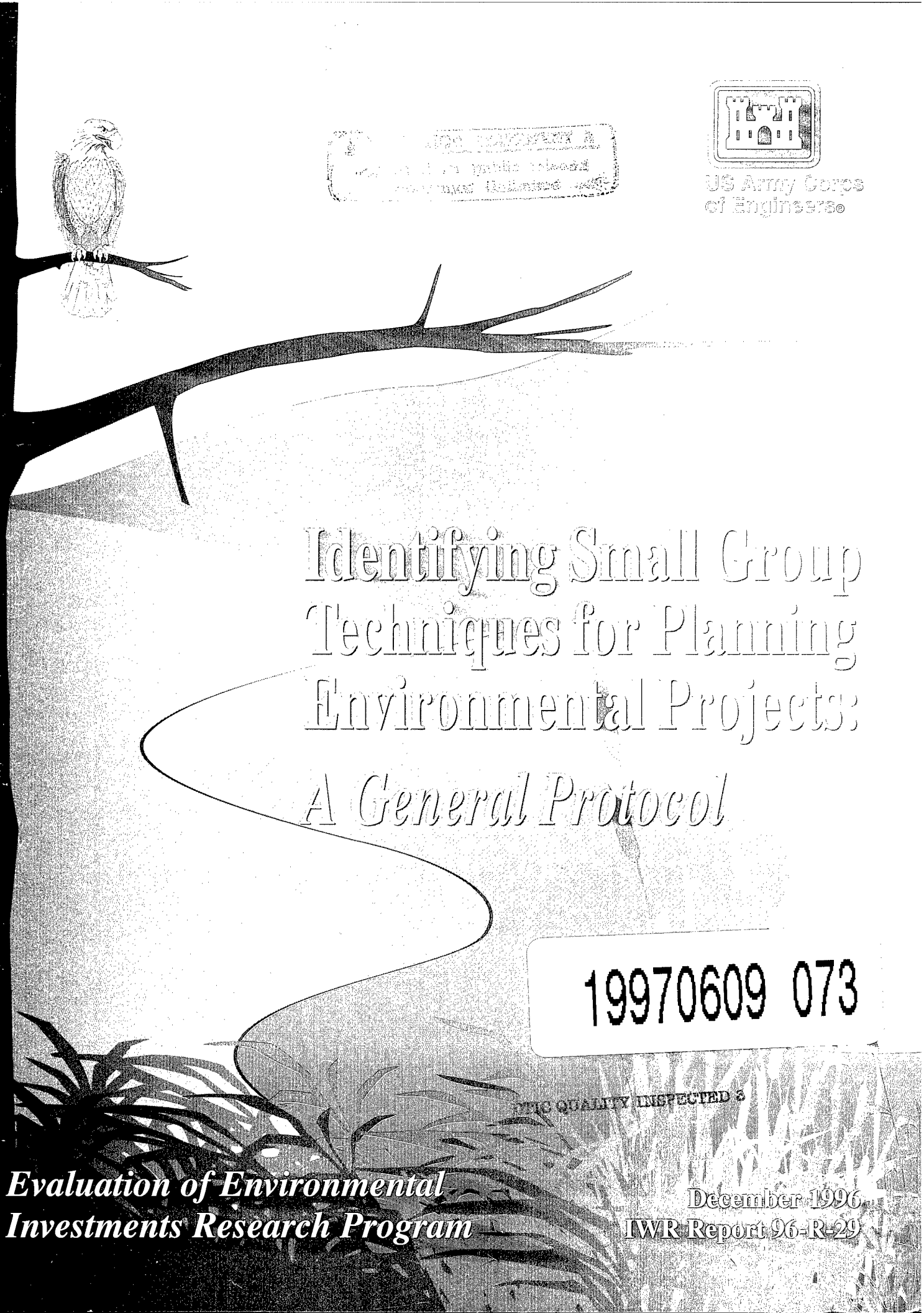

Identifying Small Group Techniques for Planning Environmental Projects: *A General Protocol*

Evaluation of Environmental Investments Research Program

December 1996
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IDENTIFYING SMALL GROUP TECHNIQUES FOR PLANNING ENVIRONMENTAL PROJECTS: A GENERAL PROTOCOL

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Views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation.

PREFACE

This study was conducted as part of the Evaluation of Environmental Investments Research Program (EEIRP). The EEIRP is sponsored by the Headquarters, U.S. Army Corps of Engineers (HQUSACE). It is jointly assigned to the U.S. Army Engineer Water Resources Support Center (WRSC), the Institute for Water Resources (IWR), the U.S. Army Engineer Waterways Experiment Station (WES), and the Environmental Laboratory (EL). Mr. William J. Hansen of IWR is the Program Manager and Mr. H. Roger Hamilton is the WES Manager. Technical Monitors during this study were Mr. John W. Bellinger and Mr. K. Brad Fowler, HQUSACE. The field review group members that provide complete Program direction and their affiliations are: Mr. David Carney, New Orleans District; Mr. Larry M. Kilgo, Lower Mississippi Valley Division; Mr. Richard Gorton, Omaha District; Mr. Bruce D. Carlson, St. Paul District; Mr. Glendon L. Coffee, Mobile District; Ms. Susan E. Durden, Savannah District; Mr. Scott Miner, San Francisco District; Mr. Robert F. Scott, Fort Worth District; Mr. Clifford J. Kidd, Baltimore District; Mr. Edwin J. Woodruff, North Pacific Division; and Mr. Michael Passmore, WES (formerly with Walla Walla District). The work was conducted under the Evaluation Framework Work Unit of the EEIRP. Ms. Joy Muncy of the Technical Analysis and Research Division (TARD), IWR and Mr. Jim Henderson of the Natural Resources Division (NRD), WES are the Principal Investigators.

The work was performed by Planning and Management Consultants, Ltd. (PMCL) under Task Order No. 31, Contract No. DACW72-94-D-0003 managed by Ms. Joy Muncy. Dr. Timothy Feather was the principal investigator in collaboration with Mr. Donald Capan, Dr. Keith Harrington, and Dr. Dale Brown.

The report was prepared under the general supervision at IWR of Mr. Michael R. Krouse, Chief, TARD; and Mr. Kyle E. Schilling, Director, IWR. At EL the report was supervised by Dr. Robert M. Engler, Chief, NRD; Dr. John W. Keeley, Director, EL; and Dr. Robert W. Whalin, Director, WES.

This report is built upon the experience and perspectives of many Corps personnel from across the nation. Their time and responsiveness to the research activities involved in this study are respectfully acknowledged.

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CHAPTER I: INTRODUCTION

It is the beginning of the feasibility phase. As the study manager for an ecosystem restoration project sponsored by the U.S. Army Corps of Engineers (Corps), you would like to arrange an initial interagency scoping meeting. You want to identify the key parameters that can be used to guide the study and measure its success once it is completed. Additionally, you may be able to identify resources the agencies can contribute. However, there are some complications. First, two of the agencies often conflict with each other because of their differing priorities regarding fish and wildlife habitat. Second, three of the agency representatives have never been involved with Corps projects. Finally, to meet your schedule, you must assemble this team quickly. You know there are techniques that can be used to improve the efficiency and effectiveness of this scoping meeting for a group of this size, but you are not sure which technique or techniques would be best. What should you do?

This is a hypothetical example of a study manager preparing for a meeting. There are a number of variables to account for, such as personalities, familiarity with the planning process, and differing goals of participants. There are many small-group techniques that could be used for guiding the scoping meeting mentioned above, but there is limited time for deciding which approach to use. This report is designed to provide a protocol, based on the components in Figure I-1, that Corps planners can use to identify small-group techniques to achieve the desired results of the meeting. It will also prepare planners to interact with facilitators when developing a meeting format that uses small-group techniques.

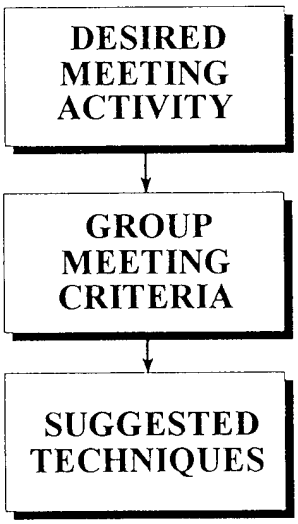

FIGURE I-1

GENERAL PROTOCOL TREE STRUCTURE

PURPOSE

The purpose of this report is to provide Corps planners with a protocol for identifying small-group techniques to support the planning of ecosystem restoration projects. The protocol will help planners consider alternative small-group techniques for use with stakeholders to (1) gather and share information, (2) generate alternatives, and (3) evaluate alternatives. General descriptions of each technique identified by the protocol are provided as an appendix to the report. Specific instructions for step by step execution of the referenced techniques are outside the scope of this report but can be found in materials listed in the bibliography.

The techniques identified by this protocol are designed to address the needs of people meeting in small groups. Task forces, planning teams, advisory boards, and steering committees are some examples of typical small-group meetings. They can be used as components of large public meetings when properly modified. Even though these techniques have been organized for ecosystem restoration planning, there are also broad applications to other planning, operations, and regulatory settings where small groups of people are brought together.

The reader of this report will come away with a basic understanding and awareness of the important planning components for designing effective small-group activities. This report provides a foundational portrayal of common small-group situations and tools. As such, this report can support information exchange and communication among stakeholders which is critical to efficient ecosystem restoration planning.

SCOPE

The Corps has a long history of working with the public in its Civil Works planning studies. Information gathered through public involvement has proven invaluable to these planning efforts. The Corps Institute for Water Resources (IWR) has been instrumental in developing techniques for maximizing the effectiveness of public involvement. Much of this work is summarized in *Public Involvement Techniques: A Reader of Ten Years Experience at the Institute for Water Resources* (1983). The Corps also has extensive experience with conflict resolution, as identified in a series of IWR publications on alternative dispute resolution (ADR). In addition, the Corps provides training for conducting public involvement and ADR through its PROSPECT courses, which are offered on a regular basis to Corps planners.

The present study is concerned with public involvement, but with an emphasis on small-group techniques for planning ecosystem restoration projects. This study evolved from previous efforts which identified a need for improving stakeholder input to Corps restoration planning. As described in Feather et al. (1995) and Schkade, Feather, and Capan (1996), the values and priorities regarding environmental planning decisions are often nested in the perspectives of the agencies and groups who are affected by a proposed project. The absence of available quantitative data (e.g., economic benefits) causes important planning decisions to be influenced by negotiated or elicited

values. This report presents techniques for gathering important planning information through the participation of stakeholders.

The contents of this report were developed from three primary sources of information: (1) literature on small-group techniques, (2) interviews with Corps ecosystem restoration planners, and (3) demonstration studies involving the testing of the protocols in the planning and conducting of a small group meeting as part of Corps ecosystem restoration projects. First, a literature review was conducted to identify techniques and to cite general problems and opportunities in small-group situations. This review identified ninety small-group meeting techniques for consideration in the development of the protocol.

Next, interviews were held with Corps planners to determine what their needs were regarding small-group planning for ecosystem restoration projects. Planners were asked to specifically identify problem meetings in the planning process and to note their familiarity with small-group techniques. This information, in combination with that from the literature review, led to the development of a series of protocol trees for identifying small-group techniques. Planners identify candidate small-group techniques by answering a series of questions based on typical meeting-design criteria. The list of ninety techniques was compressed to seventeen based on the needs identified in the interviews with Corps planners and by grouping techniques that are similar in approach. Suggestions for supplemental reading on different types of group techniques and their potential applications are made at the end of this document.

Third, demonstration studies were conducted on two Corps ecosystem restoration planning efforts to test the validity of the protocol trees. Demonstration studies included a review of the report, the use of the protocol trees by the participating Corps planner, and the implementation of identified techniques using a professional facilitator. Changes identified through the demonstration studies were incorporated, resulting in the current document.

As mentioned earlier, there are other specialized approaches the Corps has adapted for specific planning circumstances, such as ADR. ADR can be used to effectively resolve conflict in project planning and operation. Although necessary in some planning circumstances, these specialized approaches are beyond the scope of this study and are not included in this report. Similarly, computer-aided negotiation and decision making shows promise for planning applications. However, this topic is also beyond the scope of this study.

ORGANIZATION OF REPORT

The remainder of this report is organized into four chapters. Chapter II identifies opportunities for supporting ecosystem restoration planning based on interviews with Corps environmental planners and the communication literature. Chapter III develops a protocol based on the literature and on interviews with Corps environmental planners. Chapter IV presents the results of demonstration studies that apply this protocol. Chapter V summarizes the results of this effort.

CHAPTER II: GROUP TECHNIQUES AND THEIR APPLICATION TO ECOSYSTEM RESTORATION

OVERVIEW

Environmental planning in the Corps follows the six-step process of the U.S. Water Resources Council's 1983 *Economic and Environmental Principles and Guidelines for Water and Related Land Resources (P&G)*. This process is designed, through iteration, to proceed from a clear definition of the problem or opportunity to the selection of the best solution. Many of the products that come from this process are the result of analyses, discussions, and decisions with project stakeholders. The communication-related problems encountered during this process can often be attributed to inadequate information, mental blocks, inaccurate perceptions, and meeting structures that inhibit participation. Group techniques can be used to overcome these limitations and improve the quality of the products generated.

There are many challenges associated with the application of group techniques. The most significant challenge is selecting an appropriate technique or set of techniques that address the meeting goals and the circumstances surrounding the meeting. There is not a single technique that is appropriate for every meeting situation (e.g., generating alternatives for habitat restoration versus identifying available data sources). Additionally, the selection of appropriate techniques can become more complicated because of the wide range of options available. This report responds to these challenges by identifying techniques that would be useful in typical planning situations, thereby making them more accessible to planners. In Chapter III, a series of protocol trees are described that support the selection of group techniques that are most suitable for selected planning situations.

As a foundation for successful application of the protocol trees presented in Chapter III, this chapter provides important background on the nature of groups and group communication. This chapter also highlights typical situations faced by Corps ecosystem restoration planners. Furthermore, this chapter brings to light the importance of strategically associating the techniques and the planning situation for successful group interaction. This chapter is organized into four sections. First, the role of communication in ecosystem restoration planning is explored. It includes information from Corps reports and from interviews with Corps planners. Second, the communications literature is tapped to examine common *problems* in group communication. Typical problems include participant's resistance to group techniques and their reluctance to challenge the group. Third, the literature is again reviewed to present *opportunities* provided by group communication. A clearly defined purpose for meetings and the use of a neutral facilitator are among the avenues for realizing these opportunities. Finally, the communications literature and practical experience of Corps planners are combined to develop a framework for using small-group techniques in support of restoration planning. Primary and secondary opportunities for using small-group techniques are identified for each of the six steps of the planning process.

COMMUNICATION IN ECOSYSTEM RESTORATION PLANNING

Corps ecosystem restoration planning brings together groups that are subject to certain guidelines and constraints, including Corps guidance, available resources, and the missions of each stakeholder involved (especially those representing state and federal agencies). There are social and organizational factors that influence communication in the restoration planning process. The discussion below establishes a need for good communication and presents the perspectives of Corps restoration planners regarding group communication.

Need for Good Communication

Many planning activities involve group meetings. These meetings can be challenging for planners because the information surfaced can range from technical expertise to personal beliefs. Stakeholders can have technical information about the restoration site as well as highly evolved opinions and perspectives about site degradation and appropriate restoration actions. The challenges of incorporating stakeholder information into the planning process have been recognized for many years by the Corps. Delli Priscoli (1983) recognized a need for civil engineers to complement their engineering training with tools from the social sciences, including small-group processes, because "much of the information needed for social assessment is not readily available in standard statistical formats."

Corps planners often experience communication problems in planning. Effective communication with partners and the public are two long-standing challenges that Corps planners face in planning ecosystem restoration projects (Schkade, Feather, and Capan 1996; Feather and Capan 1995). Interviews conducted for this study have verified these challenges as well as the need to "bridge" communication gaps between people from different disciplines (e.g., engineering, biology) or between people with differing expectations (e.g., landowners, resource agencies, environmental interest groups).

Previous Corps studies (mentioned above) suggest that using techniques for involving stakeholders can improve communication. Creighton (1983) and Delli Priscoli (1983) identified several small-group techniques that could benefit planning and public involvement. Schkade et al. (1996) describe a specially designed small-group approach that could be used during the initial scoping process to improve coordination among a group of stakeholders. However, additional communication benefits can be realized by establishing a more direct association between these techniques and opportunities for their use in the planning process. Specific areas of concern are described in the next section, which summarizes interviews with Corps ecosystem restoration planners.

Interviews with Corps Planners

Ten Corps planners with experience in ecosystem restoration projects were interviewed as part of this investigation. Their areas of expertise were varied, including economics, archeology, biology, public affairs, landscape architecture, and ecology. The purpose of the interviews was to solicit their pragmatic perspectives on three subjects:

- When groups form during planning efforts
- Communication challenges in restoration planning
- Planner familiarity with structured group techniques

Interviews were conducted over the telephone. The planners were sent a preliminary guide (found in Appendix A) identifying the themes to be explored during the interview. The structured interview was composed of twelve questions designed to address the three subjects. Each question was designed to be open-ended, allowing the participants freedom to respond in detail. The questionnaire guide is located in Appendix B.

Although the interviews were intended to last only thirty minutes, the average interview time was approximately fifty minutes. The interview responses revealed several themes relevant to this study which are described below.

When Groups Form

In response to the question regarding when groups formed during the planning process, the planners typically identified public meetings. Other situations identified were the formation of interdisciplinary teams at the beginning of a study and interagency teams assembled during the scoping of a study. Interagency teams were not identified in all of the interviews, but when formed, they usually met once a month until completion, depending on the size and scope of the restoration project.

Another question asked was when the most challenging group meetings occurred. Outside of public meetings, the response given most often was the evaluation and selection of alternatives. Corps recommended alternatives are often modified by the local sponsor or an interagency group, which is an acknowledged utility of the planning process. However, many expressed concerns about the process, principally regarding ineffective information exchange during meetings. These exchange problems further compound the challenge of developing, analyzing, and reviewing alternatives. Other challenging group meetings that were identified include the initial scoping meeting and in-progress reviews with Division and/or Headquarters, as well as meetings to set objectives, review data, determine criteria, and resolve issues.

Communication Challenges

Sharing information and soliciting feedback were two of the most common communication challenges identified in the planning process. Whether it was presenting a proposed alternative, analyzing data, or addressing initial perceptions during a scoping meeting, all of the planners indicated some difficulty in communicating with other group members, including Corps personnel. Reasons given for this included hidden agendas, differing levels of expertise, lack of trust of federal government agencies, personalities, and changes in personnel.

One additional communication challenge identified by several planners was "language differences" between disciplines involved in ecosystem restoration planning. The most common language difficulties cited were those between biologists and engineers, although it was noted that it can occur across other disciplines, even among fisheries biologists and wildlife biologists. Several comments indicated that project managers often act as a bridge between disciplines, often a difficult task.

Most of the planners indicated they need to "overcoordinate" with group members to keep them informed. Face-to-face interaction is preferred. However, due to the wide variety of personnel that become involved with ecosystem restoration projects (in some cases as many as thirty people), it is difficult to have a regularly scheduled meeting. While extensive coordination via telephone, electronic mail, and fax machine is quite common, quick resolution of conflicts regarding results and conclusions, including those within Corps interdisciplinary teams is difficult to attain.

Familiarity with Group Techniques

The planners expressed some familiarity with group techniques, but only a few identified approaches that did not apply to large public meetings. Recognized techniques included Decision Matrix, Rank-Pairwise Comparison, Nominal Group Technique, Brainstorming, and Focus Groups. Many of these and other techniques are presented later in Chapter III and in Appendix C.

A few of the planners felt comfortable facilitating some of the approaches discussed during the interviews, especially if the group was a Corps interdisciplinary team. However, several planners cited two reasons for utilizing an outside facilitator. The first was that external facilitators are trained professionals who can relieve planners of meeting design and preparations. The second was that facilitators allow Corps planners to participate in the meeting as stakeholders.

Interview respondents had mixed perspectives regarding the value of group techniques for ecosystem restoration planning. There was general support for techniques that would assist planners during project planning. However, some comments indicated that certain techniques generated unrealistic information or alternatives. This suggested a need to focus on practical applications if participants are to feel that they have made the best use of their time.

COMMON COMMUNICATION PROBLEMS OF GROUPS

In this section, the communication literature is used to discuss common communication problems of groups and to identify opportunities where group techniques can be used in response. There are three major issues regarding group communication problems: (1) participant resistance, (2) groupthink, and (3) limitations of traditional meeting formats. These are discussed below.

Participant Resistance to Techniques

People generally appreciate that groups make better decisions than individuals, recognizing that "two heads are better than one" (Moore 1987). However, many decision-making groups do not realize their full potential because they are not utilizing the most appropriate process or technique. Although group techniques can identify new options and explore values important to group members, people often resist the idea of generating new information. According to Fisher, Ury, and Patton (1991), this resistance occurs because people normally attempt to narrow options as a means of reducing confusion and difficulty. Additionally, many people are reluctant to consider other alternatives because of their personal investment and/or attachment to a particular solution.

Group research in the 1960s and 1970s concentrated on the social and emotional development of groups, creating what was termed by some as a "touchy feely" approach (Moore 1987). More attention was given to people involved in the groups and less to the products that came from them. This perception of groups still exists today, even though many techniques have been developed that focus on improving group productivity and harmony through accomplishing tasks.

Resistance to group techniques can be further attributed to disorganization of the participants. The techniques discussed in this report can add structure to group interaction and, in many instances, guide the participants through the task they are attempting to complete. Goodall (1990) notes that participants can "prepare to communicate effectively" if they generally know what roles they should play. This provides the foundation for interaction among the participants, especially in encouraging each group member to evaluate the contributions of others.

The Phenomenon of Groupthink

"Groupthink" is a social phenomenon where a group of people involved in making a decision are very cohesive and do not challenge ideas or motives of others. Groups that meet over an extended period of time often develop a rapport among members that can lead to excessive avoidance of conflict during meetings. Groups should not be afraid to critique ideas or information presented to them in a professional and productive manner. Groupthink can result in disasters like the Bay of Pigs or the space shuttle *Challenger* explosion (see Janis 1972; Gouran, Hirokawa, and Martz 1986). Individuals involved in established groups can be placed under extreme pressure to make a decision

make a decision and are often isolated from others who could provide a more comprehensive perspective. This setting gives the group an exaggerated perception of self-importance that can lead to greater risk acceptance and less interest in additional information.

Janis (1982) identified several ways to avoid or reduce groupthink. These approaches recommend that group leaders encourage the members to challenge issues, provide opportunities for the group to divide and reconvene, and seek additional information outside the group. Small-group techniques can be adapted to incorporate these approaches.

Limitations of Traditional Meeting Formats

Some of the traditional approaches to structured group involvement have flaws that can inhibit the full participation of its members. For example, Fox (1987) identifies procedural problems and subversive influences that typically exist in the use of parliamentary procedure. In this meeting format, individuals have the opportunity to pursue hidden agendas, use status to gain consensus for a decision, delay participation due to tardiness, or limit commentary for fear of sounding foolish or being punished. Although parliamentary procedure does provide structure for members of a group to be heard, it does not encourage the participation of all group members.

Individuals accustomed to traditional meeting formats may have some difficulty adapting to new group techniques. For example, some techniques require group members to suspend the constraints of reality or to perform activities that could be perceived as unnecessary or frivolous. These activities are used to free participants' minds from their normal filters and habits. Removal of these filters allows a consideration of unusual or impractical ideas that can lead to practical alternatives. This liberation has been adopted by companies like Xerox, Hershey Foods, and 3M with "creativity training" for their employees (VanGundy 1992).

Opportunities in Group Communication

The communication literature also suggests that group techniques can be used to improve group communication and thereby enhance the group's efficiency and effectiveness in meeting their objectives. One benefit of group interaction is the ability of members to interpret information for other members. People usually make decisions based on past experiences and relationships (Plous 1993). A group member, in many situations, can validate information for another to reduce conflict and mistrust. Research by Schkade et al. (1996) incorporated several group techniques for soliciting stakeholders' perspectives regarding Corps ecosystem restoration projects. As participants were guided through the process, there were a number of instances where little-known information was surfaced, such as budgeting schedules or legal requirements. This allowed the entire group to recognize each stakeholder's scheduling concerns and, in some cases, prompted participants to seek further coordination for meeting particular deadlines. Some of the techniques discussed in this report are intended to facilitate informational flows in these situations.

The value of sharing perceptions during planning is illustrated by Peterson and Horton (1995) in their examination of the U.S. Fish and Wildlife Service's (USFWS) approach toward landowners regarding the protection of endangered species habitat. In this case, there were no provisions for including the landowners, primarily ranchers, in the development of environmental policy. This led to difficulty in reaching cooperative agreements between the USFWS and the landowners. The inclusion of the landowners using a structured group technique not only could have reduced the tension that existed but also could have improved the policy developed for protecting endangered species.

Feather and Capan (1995) identified a program in the Corps New Orleans District that incorporated a collaborative planning effort for developing ecosystem restoration projects. Stakeholders from the Corps, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, Louisiana resource agencies, and academic institutions were brought together as part of a task force charged with restoring and protecting coastal wetlands. This task force has promoted understanding among the participants and has facilitated public input and successful ecosystem restoration projects.

The consequences of a failed environmental project are usually not as severe as the examples mentioned earlier (e.g., Bay of Pigs, *Challenger* disaster). However, a failure could result in a significant loss of resources for the agencies that sponsor these projects. For example, the cost-sharing investment by the North Dakota Department of Game and Fish in a restoration project--although small by most standards--represented a significant proportion of their operating budget (Feather and Capan 1995). Small-group techniques can be structured to provide a series of checks and balances that ensure effective stakeholder communication to increase chances of success.

Small-Group Purposes

To utilize group techniques most effectively, the purpose of the group must be clearly defined. There are several approaches for classifying the purpose of a group. Infante, Rancer, and Womack (1993) organize groups into three categories based on the purposes they serve: task-orientation, therapy, and learning. A review of research by Schkade et al. (1996) and Feather and Capan (1995) indicate that the planning of Corps environmental projects is primarily related to task-orientation and learning situations. Therapy groups are used to help individuals solve personal problems, which is not pertinent to this effort.

Task-oriented groups attempt to solve problems through thorough examination of the situations, generation of ideas, and evaluation of those ideas. Potential solutions are normally reviewed and selected for implementation by the group. These are typical activities found in the Corps planning process.

Learning groups are used to acquire more information and for understanding an issue or problem. These groups have discussions to share unique perspectives that can lead to new insights, a greater knowledge base, and motivation for additional study. Although traditional Corps projects have meetings for this purpose, learning groups are especially important for ecosystem restoration

because of the current uncertainty associated with some aspects of the environmental and restoration sciences.

The three main activities associated with task-oriented and learning groups are (1) discussion, (2) idea generation, and (3) decision making. As will be evident later in this chapter, products that are developed in the planning process can be enhanced through the use of group techniques that facilitate these activities. The techniques not only enhance the product but can also promote greater involvement by group members because of a greater sense of ownership in the results.

The Role of Facilitation

Group techniques are typically applied using a trained facilitator. A facilitator can help groups avoid problems and seize opportunities while using a group technique. Schwarz (1994) defines group facilitation as "a process in which a person who is acceptable to all members of the group, substantively neutral, and has no decision-making authority, intervenes to help a group improve the way it identifies and solves problems and makes decisions, in order to increase the group's effectiveness." Schwarz goes on to say that this definition typically excludes using a group member, because they have a substantive interest in the outcome. There are some occasions where a group member could lead a group, such as an idea generation session. However, when key decisions are to be made, it is important to have someone outside the group facilitate the meeting.

Many federal agencies have in-house facilitators that can assist in the development and execution of small-group meetings. However, as noted earlier, an in-house facilitator may inhibit group communication, especially in a high-pressure, sensitive situation. This is because that individual is associated with a stakeholder organization and may not be perceived as an objective facilitator.

A facilitator provides structure to a group beyond the application of techniques. This added structure comes from attentiveness to the participants' needs. A facilitator helps the group develop ground rules at the beginning to ensure a thorough examination of a topic by focusing on issues, not people or personalities. Additional information about facilitation is found in Appendix C.

SUPPORT FOR RESTORATION PROJECTS

The beginning of this chapter recognizes that the *P&G* provides the conceptual foundation for Corps planning. Its six-step planning process outlines the philosophy and procedures for project planning, including ecosystem restoration. These steps follow a rational sequence of activities from identification of problems and opportunities to selection of a recommended solution. The following discussion emphasizes opportunities for using small-group techniques to support planning efforts which occur in the six steps. For additional information about ecosystem restoration planning, see

the restoration guidance (EC 1105-2-210, U.S. Department of the Army 1995) and the *Evaluation of Environmental Investment Procedures: Overview Manual* (Harrington and Feather 1996).

The benefits of group techniques highlighted in the communication literature can be realized in Corps restoration planning. The remainder of this report is aimed at this goal. To understand how group techniques can be used in restoration planning, it is first necessary to classify the universe of group techniques. Group techniques can be organized into three categories according to the type of activity involved and resulting product: (1) those that foster creativity to generate new information, (2) those that improve discussions resulting in a greater collective knowledge base among group members, and/or (3) those that structure decisions beyond basic criteria to identify the most beneficial alternative for the group.

Many group activities may be repeated in the planning process, potentially with different communication objectives. Consequently, there are multiple opportunities for the use of group techniques in all six steps of the planning process. In Table II-1, primary and secondary support opportunities for discussion, idea generation, and decision making are identified based on the most common situations described in the interviews with Corps planners. Primary support opportunities are those where techniques can be used in almost every planning situation. Secondary support opportunities can result from two circumstances: (1) information could have been gathered/generated in a previous step, or (2) there are less common planning situations where a technique can be used. These opportunities are discussed in relation to the six steps of the planning process below.

Discussion Techniques

Discussion techniques are used to exchange information and share perspectives among group members, creating a greater group knowledge base. They also provide structure to group meetings to allow members to hear and be heard while creating a greater sense of cooperation and ownership in working toward a solution. Some of the planners interviewed for this study indicated that exchanging information is one of the challenges they regularly encounter during the planning of a project. Thus, discussion techniques would be useful in five of the six steps.

When teams are brought together to specify problems and opportunities (step 1), each member has unique information to contribute, whether it is knowledge of restoration programs the project may need to consider (e.g., North American Waterfowl Management Plan), indicators of the problem (e.g., declining waterfowl population), or constraints (e.g., zoning restrictions). Secondarily, information regarding available data that could be used for the forecast and analysis of conditions (step 2) and for the evaluation of the effects of alternative plans (step 4) may surface during discussions at the initial scoping meeting. This information may be revisited during steps 2 and 4. In step 3, team members may have knowledge of past engineering approaches that could be modified for implementation. In step 5, team members may present their reasons for supporting a particular alternative (e.g., it is popular with locals).

TABLE II-1
COMMON OPPORTUNITIES FOR GROUP TECHNIQUES
DURING ECOSYSTEM RESTORATION PLANNING

	Step 1 -- Specify Problems and Opportunities	Step 2 -- Inventory, Forecast & Analysis of Resource Conditions	Step 3 --Formulate Alternative Plans	Step 4 --Evaluate Effects of Alternative Plans	Step 5 -- Compare Alternative Plans	Step 6 -- Select Recommended Plan
Discussion (Knowledge)	●	○	●	○	●	
Idea Generation (Creativity)	●		●			
Decision Making (Evaluation)	●			○	○	●

Key: ● Primary Opportunity
○ Secondary Opportunity

Idea Generation Techniques

Idea generation techniques can be used to increase the level of creativity of a group. They are useful for developing options, especially situations where there is no immediate solution. Based on the planner interviews, idea generation techniques may be of greatest use in steps one and three.

In step 1, idea generation techniques could be used to identify problems and opportunities related to a project during the initial scoping effort. For example, the planning team may need to generate a list of possible causes of a particular problem. In step 3, idea generation techniques could be used to suggest possible features of restoration approaches. Yoe (1995) emphasizes this opportunity with a list of twenty-six group techniques that could be used in the development of alternatives for Corps Civil Works projects. Furthermore, several interviewed planners noted that alternatives receive extensive review and modification. Developing and presenting a broader list of options could reduce the amount of iterations that are needed for their modification.

Decision-Making Techniques

Decision-making techniques can be used to assist groups in choosing between multiple options. These techniques rank the preferences of group members in a structured manner. Generally, this information is used to support a final group discussion to either verify the result or account for variables that may have been overlooked. Although decisions are made during all six steps, the primary support opportunities where group decision making techniques would be used most often are steps 1 and 6. Secondary support opportunities may occur in steps 4 and 5.

In step 1, key decisions are made that will affect the entire study. Items such as ecological indicators, design approaches, size of the study area, periods of analysis, and resource allocation may need to be determined early in the process, allowing all group members to use the same criteria in their planning and evaluation of the project. These criteria may be revisited in steps 4 and 5 as a means of evaluating effects of an alternative or evaluating the list of alternatives.

In step 6, the decision regarding the recommended plan is made. Some of the planners interviewed indicated they encountered difficulty in coming to consensus on an alternative because of the differences in each stakeholder's perception of the "optimum" approach. Decision-making techniques may be used to visually present the values of each stakeholder regarding a particular item, allowing conflicting perspectives to be addressed.

SUMMARY

This chapter has considered how group techniques can support restoration planning. It began with a review of the role of communication in Corps ecosystem restoration planning. It then examined common problems and opportunities of group communication and explored application of group techniques in restoration planning. It is important to note that there can be overlap among technique use within the six steps. This is especially true when using decision-making techniques for steps 4, 5 and 6, where there is significant overlap of information being examined. In the following chapter, a general protocol for the application of group techniques in restoration planning will be developed.

CHAPTER III: PROTOCOL TREE DEVELOPMENT

OVERVIEW

This chapter develops a general protocol for selecting small-group techniques based upon the planning activity and characteristics of the group. The protocol consists of a series of decision trees that direct the user to a suggested technique. The criteria used to structure the protocol trees— and an example of a sample application to an ecosystem planning situation—are also included in this chapter.

TECHNIQUE IDENTIFICATION AND SELECTION

Group techniques offer a wide range of possibilities for Corps planners to use for restoration projects. A general review of the literature surfaced ninety different techniques that could be used for facilitating discussion, generating ideas, and making decisions within small-group settings. The references used in the literature review and the list of ninety techniques are found in Appendices C and D, respectively.

The strategy employed in this study was to start with a wide range of available techniques from the literature and then refine the list so that it would be more directly applicable to Corps planning based upon review and analysis of the Corps planning process. To keep the list concise, the techniques from the list of ninety were first organized according to the type of activity they would support (i.e., discussion, idea generation, and/or decision making). Some of the techniques in each category have their own particular characteristic or nuance that distinguishes them from the others. In this case, careful consideration was given to listing the most common technique that represented a very closely related group of techniques. For example, Brainwriting (found in the idea generation list in Table III-1) was used to also represent Collective Notebook, Ideawriting, Method 6-3-5, and Pin Cards. Each of these techniques is similar (and in some cases, identical), but Brainwriting was found to be the most common term and the easiest to use.

The final step in the refinement process involved examination of the techniques according to the comments received from the Corps planner interviews and other recent literature (Schkade, Feather, and Capan 1996; Feather and Capan 1995) that point toward common ecosystem restoration planning situations faced by Corps planners. Techniques that are not applicable to those situations were eliminated from further consideration.

This refinement process led to the list of eighteen candidate techniques that efficiently represent a spectrum of approaches to small-group situations faced by Corps environmental planners. These techniques are grouped by activity in Table III-1 and are annotated in Appendix

TABLE III-1

CLASSIFICATION OF GROUP TECHNIQUES BY ACTIVITY

Discussion	Idea Generation	Decision Making
Attribute Association	Attribute Association	Decision Matrix
Deployment Flowchart	Brainsketching	Effective-Achievable Matrix
Fishbone Diagram	Brainstorming	Interpretive Structural Modeling
Fishbowling	Brainwriting	Multivoting
Focus Group	Fishbone Diagram	
Force-Field Analysis	Gallery Method	
Gallery Method	Is-Is Not Matrix	
Is-Is Not Matrix	Nominal Group Technique	
Nominal Group Technique	Tree Diagram	
Tree Diagram		

C. The annotations give important descriptive information to explain what is involved with the technique and to verify the technique's inclusion in a particular category. Citations for each technique are also provided. Note that if step by step instructions on how to apply the technique are desired, the reader should go to the cited reference.

PROTOCOL TREE ORGANIZATION

Protocol trees are used to organize the different group techniques. The structure of the trees is similar to the questions used for planning public involvement activities as identified Creighton, Delli Priscoli, and Dunning (1983). Planners progress through the trees by answering a series of questions as they consider possible techniques for their particular situation. Four trees were developed that lead to suggested techniques. The first protocol tree in Figure III-1 directs the user to one of the remaining protocol trees (Figures III-2 through III-4), depending on the desired activities of the group for reaching their goals. These latter three trees correspond to the three classifications of group techniques (discussion, idea generation, and decision making).

Once the appropriate tree has been identified, the user will answer a series of questions based on design criteria developed from the literature on group techniques and from the interviews with Corps planners. The framed boxes in the protocol trees indicate the user has reached a suggested small-group technique and should refer to the description of that technique found in Appendix C. If there is more than one desired activity for the group meeting, the trees can be used again to identify additional techniques. Examples of multiple use of the trees are presented at the end of this Chapter and in Chapter IV.

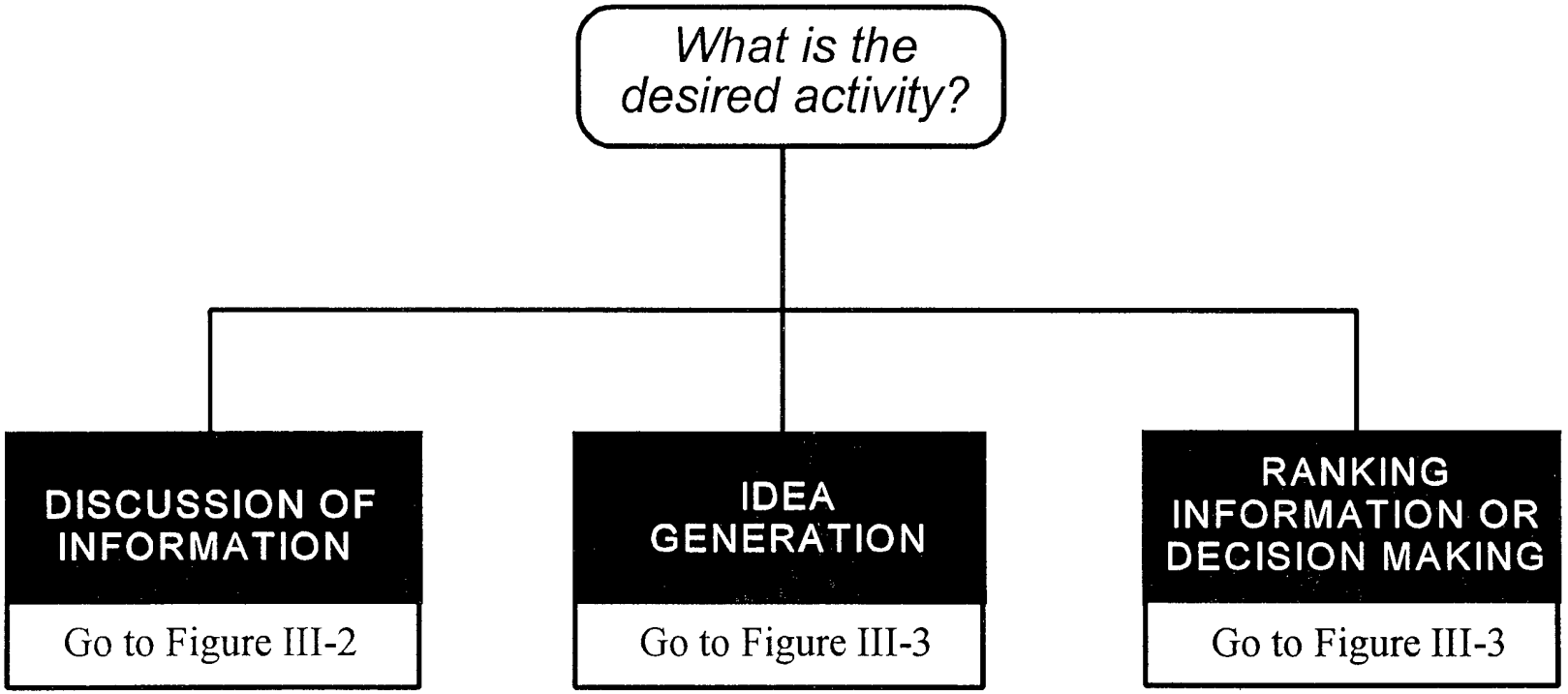

FIGURE III-1

APPROACH IDENTIFICATION TREE

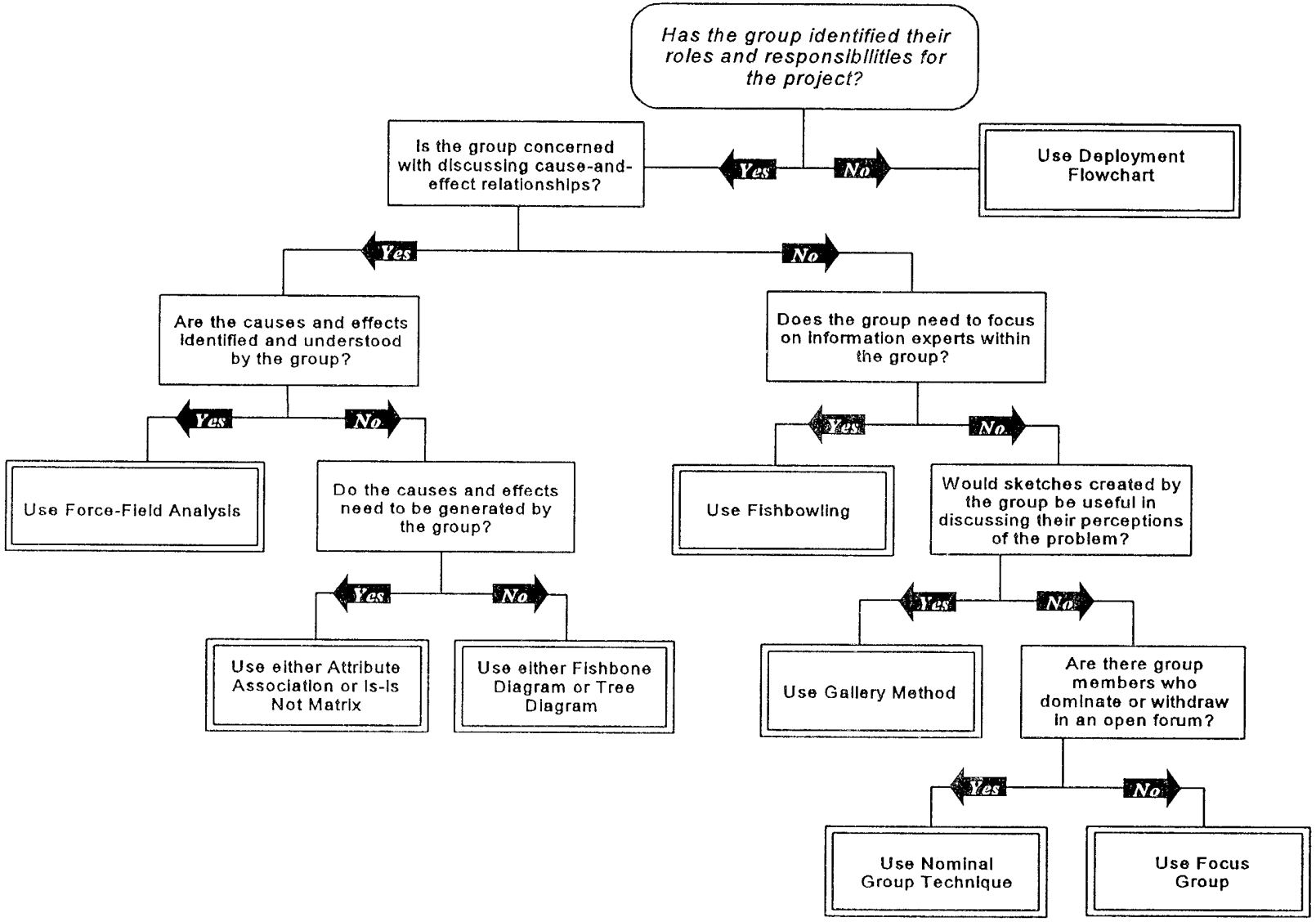

FIGURE III-2

DISCUSSION PROTOCOL TREE

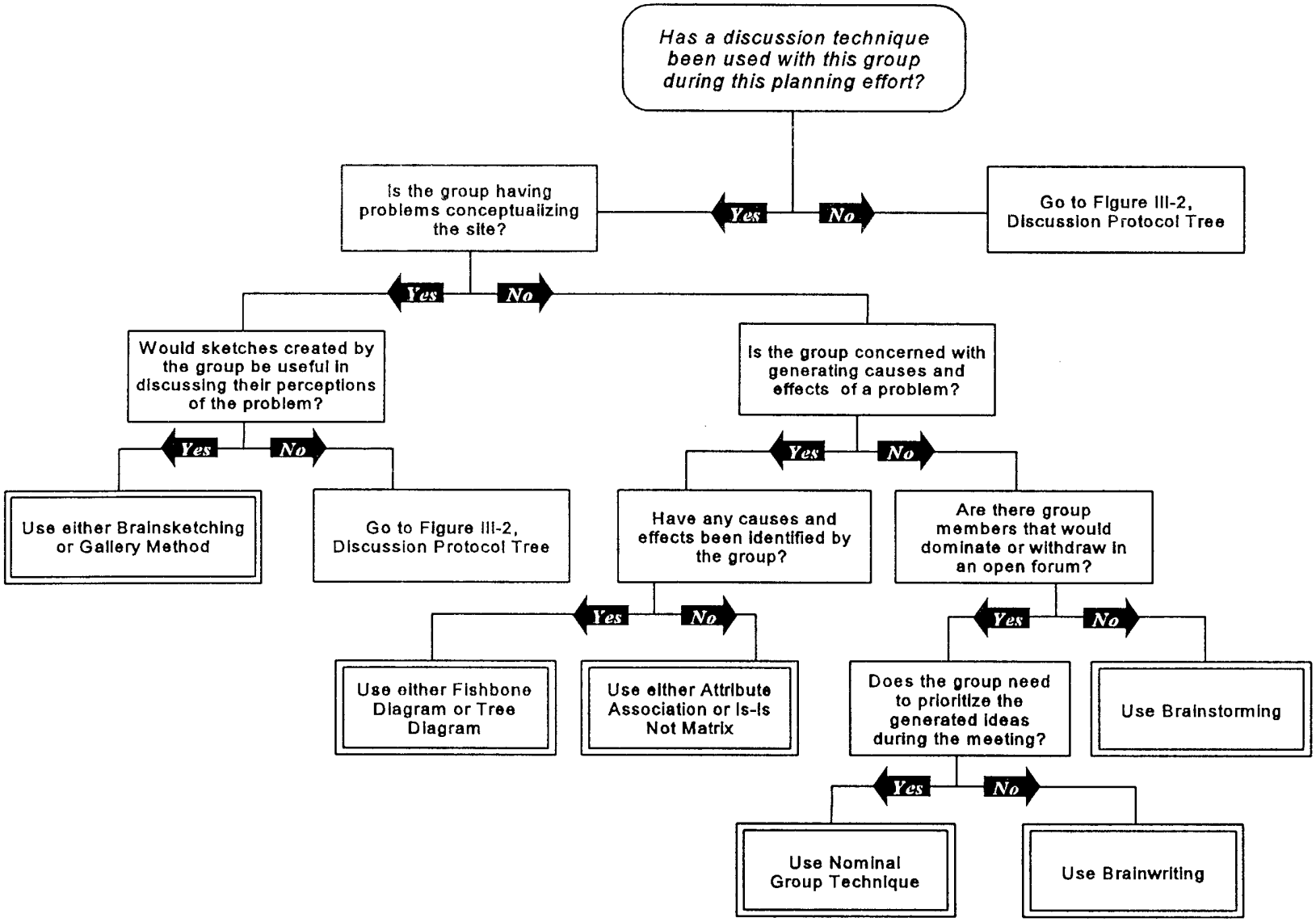

FIGURE III-3

IDEA GENERATION PROTOCOL TREE

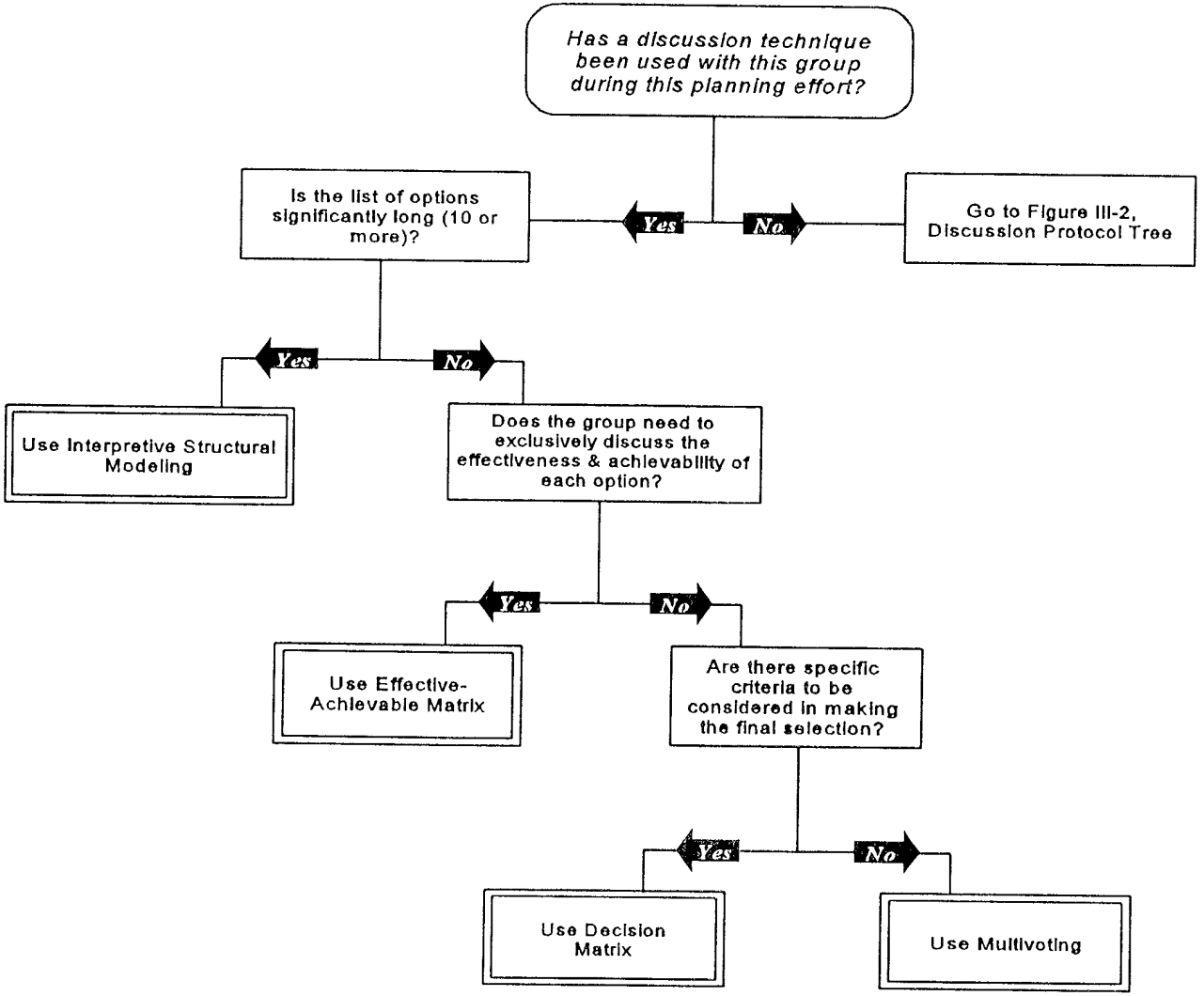

FIGURE III-4

DECISION-MAKING PROTOCOL TREE

An important consideration in designing the trees was to promote basic discussion during the first meeting of a group. It is important for the group to have an initial discussion regarding study goals and expected steps. This allows the group to have a shared understanding of what will happen during the study as well as the resources members can provide.

Users should note that these protocol trees provide general guidance to the planner in considering options for a small-group activity. If the trees lead the user to a technique that does not appear appropriate, the user is encouraged to consider, in specific terms, why it may not be appropriate. This may lead to a different answer for one of the questions in the protocol trees. Experimentation, by way of considering alternative avenues within the protocol trees, is encouraged and will open up the range of possibilities to the planner either for the situation at hand or future group technique opportunities. However, users should recognize that they will identify situations where certain group techniques are simply not appropriate. For example, it might be considered inappropriate to use the Interpretive Structural Modeling technique for a small, low budget project because its application requires a significant amount of resources (e.g., amount of time required, needed personnel, customized software, computer projection equipment).

Selection Criteria

The three group activity types (discussion, idea generation, and decision making) for classifying group techniques were used to structure the protocol trees. The questions asked within each of those trees relate to four criteria that were identified through the interviews with Corps personnel and the literature review. They are (1) planning goals/activities, (2) history of the group, (3) acceptance of new ways of thinking, and (4) amount/type of information available. These criteria and their corresponding questions used in the trees are described below.

Planning Goals/Activities

The most important questions to be answered when selecting a group technique are "What are the goals of the group?" and "What type of activities should occur at the meeting?" This first question is addressed in Figure III-1, when the planner is asked, "What is the desired activity?" More specific questions within each tree are asked regarding specific products (or goals) that may be desired from the meeting. These questions relating to planning goals and activities are listed below.

Has the group identified their roles and responsibilities for the project? This is the initial question in the discussion protocol tree. An answer of no directs the user to the deployment flowchart technique. This technique is useful for identifying the steps and roles of a planning process, and it also allows for other members to identify resources they can contribute or information they require. Generally, this technique should be the first one used at the initial group meeting.

Has a discussion technique been used with this group during this planning effort? This question has been included at the beginning of the idea generation and decision-making protocol trees (Figures III-3 and III-4) to ensure that the group members have discussed the planning goals and sequence of activities. As mentioned previously, it is important that the group members have discussed the planning process. This allows group members to fully understand what will occur during the process and what information is needed at each step. An answer of yes to this question directs the user to continue with the tree they are using. An answer of no directs the user to the discussion protocol tree. If the group is meeting for the first time, a discussion technique should be used prior to any idea generation or decision-making technique.

Is the group concerned with discussing (generating) cause-and-effect relationships? This question is included in the upper-middle sections of the discussion and idea generation trees (Figures III-2 and III-3) to determine if the group members need to discuss or generate the cause and effect linkages of a particular problem. For example, if the group is being brought together to identify causes of erosion in a watershed, the planner using the trees would answer yes and be directed toward techniques that specifically help in discussing or generating information related to cause-and-effect relationships. An answer of no directs the user to answer other questions to consider techniques not related to cause-and-effect relationships.

Would sketches created by the group be useful in discussing their perceptions of the problem? This question in the middle-right section of the discussion tree and the left section of the idea generation tree explores the feasibility and value of using sketches to enhance communication. (Note: The reference to sketches is simple drawings created by the participants during the meeting, and excludes materials generated prior to the meeting, such as GIS maps.) The use of a sketching technique may be appropriate for groups with members that do not have expertise in engineering or design. One example of using a sketching technique would be an initial design for a project, allowing group members to identify problem areas and to sketch possible solutions. Answering yes leads to the recommendation of a technique where group members create sketches of the project area or possible solutions. An answer of no to this question in the discussion tree directs the user to answer additional questions leading to other techniques. An answer of no to this question in the idea generation tree directs the user to the discussion tree to identify another technique for clarifying the perceptions of the group members.

Does the group need to exclusively discuss the effectiveness and achievability of each option? This question is included in the middle of the decision-making protocol tree to determine if similar options are effective and feasible. Answering yes to this question leads to the suggestion of using an Effective-Achievability matrix. This approach would be particularly useful for qualitatively comparing techniques that were quantitatively similar. An answer of no requires answering an additional query to select a decision-making technique.

Does the group need to prioritize the generated ideas during the meeting? Some of the techniques can serve more than one purpose. This question is asked in the lower right

section of the idea generation tree, giving the user a chance to consider the incorporation of a ranking activity without going to the decision-making tree. Answering yes would suggest the use of Nominal Group Technique. An answer of no would direct users to the Brainwriting technique, which generates a list of ideas but does not prioritize them.

History and Characteristics of Group Members

The history and characteristics of the group members are important criteria to consider when selecting a group technique. The techniques included in the trees are designed to help group members work together to overcome problems (e.g., groupthink). However, it is important to consider the working relationships in the group and the level of participation of each member. This is especially important information for the facilitator. An examination of the group history could also determine whether or not a discussion technique has been used with the group to familiarize the members with the overall planning process, as described above.

Are there group members who would dominate or withdraw in an open forum? This question is asked in the lower right section of the discussion and idea generation trees to determine if any group members speak excessively or need encouragement during open discussions. An answer of yes in the discussion tree would direct the user to select Nominal Group Technique. This technique is effective in encouraging participation and in focusing individuals who tend to dominate discussions. Answering yes in the idea generation tree directs the user to answer another question regarding the need to rank information. An answer of no in either tree suggests techniques that are not designed to specifically control the amount of speaking by group members.

Acceptance of New Ways of Thinking

Some group techniques are structured to encourage consideration of new ideas or to promote new ways of perceiving things. However, some techniques require group members to participate in activities requiring them to think or act in ways that are contrary to their normal daily routine. Some activities may seem unorthodox or unfamiliar to the group, such as drawing pictures or considering what initially may appear to be implausible options. These activities are used to stimulate creativity and disengage the filters people use for making decisions quickly in their daily lives.

Is the group having problems conceptualizing the site? This question in the top section of the idea generation tree directs the user to determine if group members are having difficulty in understanding or sharing perceptions regarding the project area. A group may be challenged in expressing or understanding aspects of a project area, due to lack of familiarity of the area or a lack of technical expertise. An answer of yes to this question directs the user to consider the use of drawings created by the group members to clarify perceptions of the problems in the study area and,

if appropriate, suggest solutions to those problems. An answer of no directs the user to answer additional questions to identify an idea generation technique.

Amount/Type of Information Available

These criteria consider the type of information available. The information can be quantitative or qualitative. If there is a particular type of information already in place, such as a list of attributes of a problem, a technique may be chosen to build upon it. The absence of information may require using a specific discussion and/or idea generation technique. In some cases, it may be important to distinguish how much information is available, especially for decision-making situations.

Are the causes and effects identified and understood by the group? This question in the center left section of the discussion tree determines if a list of causes and effects exist, and if the group knows the meaning and relationships of the components. The results of several studies may have identified specific effects of causal activities. If they are known, answering yes to this question would lead to using Force-Field Analysis to examine connections and determine what approaches could be used to offset impacts.

Do the causes and effects need to be generated by the group? This question in the center section of the discussion tree is asked to determine if a list of causes and effects for a project area need to be created. Also, this question serves as an opportunity to link different activities. If the answer to this question is yes, it suggests techniques for generating cause-and-effect information. If the answer is no, it suggests techniques for organizing cause-and-effect information.

Have any causes and effects been identified by the group? This question in the center section of the idea generation tree is similar to the one listed above in that it determines if there is any existing information. If the answer is yes, techniques are suggested that organize the existing information, allowing additional ideas to be generated. If the answer is no, techniques are suggested to generate information.

Is the list of options significantly long (ten or more)? This question in upper left section of the decision-making tree determines the amount of alternatives being considered for evaluation. If the answer is yes, the tree suggests the use of Interpretive Structural Modeling. This technique runs most efficiently with the aid of a computer application. If the answer is no, the user is directed to proceed down the tree.

Are there specific criteria to be considered in making the final selection? This question near the bottom of decision-making tree identifies existing criteria that will be used to evaluate alternatives or information. If criteria exist, an answer of yes directs the user to the Decision

Matrix technique. An answer of no suggests the use of Multivoting, which collects votes for alternatives based on the preferences of group members.

Sample Application

The example situation at the beginning of Chapter I considers a planner who is preparing to conduct an interagency scoping meeting. The planner has decided that a small-group technique would be helpful in soliciting the needed information. The first task is to identify the desired group activity per Figure III-1. Assuming that a group of stakeholders was just beginning the planning process (step 1), there would need to be an exchange of information between the group members regarding the objectives and scope of the study. Since this would be the first meeting, the planner would need to use a discussion approach. This would lead the planner from Figure III-1 to Figure III-2.

The first question in Figure III-2 asks, "Has the group identified their roles and responsibilities for the project?" Since this is the first planning meeting for the assembled group, and since three of the agency representatives have no experience with Corps projects, the planner would answer no to the question. As a result, the tree suggests using a Deployment Flowchart. The planner would then turn to the Deployment Flowchart description in Appendix C to determine if it would be appropriate for the meeting. Since the description and example indicate that the flowchart could be structured to present key junctures in the planning process and identify where contributions of members could be made, the planner would then select it as the first component of the meeting design.

It is important to note that the use of the Deployment Flowchart typically requires one and a half hours to be effective. If desired, this technique could be designed to accommodate a range of issues and last longer depending on the planner's needs (e.g., identify not only stakeholder roles, but also specific dates for providing data and other resources). Additionally, other constraints that may affect the meeting (e.g., lengthy agenda, limited time to meet) need to be considered in the design of the overall meeting.

In the next step of this sample meeting, the planner wants to identify parameters that could be useful to guide the study and to measure its success. This could include items like increasing waterfowl populations, reducing sedimentation, and increasing fish habitat. Since this information has not been generated yet, the planner would return to Figure III-1 and select idea generation as the desired activity, which leads to Figure III-3. The first question asks, "Has a discussion technique been used with this group during the planning effort?" Since Deployment Flowchart has been designated as the first technique to be used in this example, the planner would answer yes. The next question asks, "Is the group having problems conceptualizing the site?" The group seems to have a good grasp of the issues and extensive familiarity with the project area based on telephone discussions and correspondence, so the answer would be no. The next question asks, "Is the group concerned with generating causes/effects of a problem?" Since the group is only identifying project goals at this meeting, the answer would be no.

This would lead to the next question, "Are there group members that would dominate or withdraw in an open forum?" There are two agencies in conflict, and one of the members involved in the conflict likes to use meetings to attempt to influence people to support his positions. The answer to this question would be yes, leading to the next question, "Does the group need to prioritize the generated ideas during the meeting?" Since there is no need to prioritize them at this time, the answer would be no, leading to the Brainwriting technique. The planner would then review the description of the Brainwriting technique in Appendix C and may determine that there should be more verbal interaction among the participants than is indicated in the description. Therefore, the planner would go back to the idea generation tree and note that Nominal Group Technique and Brainstorming are near the recommended Brainwriting technique. After reviewing the descriptions of both the Nominal Group Technique and Brainstorming in Appendix C, the planner decides the Brainstorming technique would be appropriate for this situation because the goal of this activity is to generate parameters to guide the study. There will not be an opportunity at this meeting to vote on these parameters, so no one will be given a chance to influence other group members.

This example presents a hypothetical application of the protocol trees. However, it does illustrate several important points. First, the discussion tree should be used first to identify the appropriate technique. Second, the descriptions in Appendix C should be consulted to determine if the suggested technique is appropriate. Third, it displays how multiple techniques can be identified for use in one meeting. Finally, if a technique description appears inappropriate for the planning situation, examine other techniques that are in the branch near the original selection to see if they are more appropriate to the circumstances.

SUMMARY

This chapter has presented protocol trees and a set of criteria that can be used to assist planners in the selection of group techniques. The next chapter will describe their use in the field by Corps planners at two project study sites.

CHAPTER IV: DEMONSTRATION STUDIES

The protocol trees were tested by two Corps ecosystem restoration study managers: one preparing to begin the feasibility study process and one involved in the formulation of alternative plans. Each was sent a partial draft copy (Chapters I-III) of this report to prepare them for their use of the protocol trees. This chapter presents the results from the test of the protocol trees. Comments from these demonstration studies were used to improve the protocol trees as they exist in this report. The information for each demonstration study includes a general description of the project area, identification of the major players, discussion of the planning phone call, and the results of the meeting design and application (where appropriate).

CONTACT OF THE STUDY MANAGERS

An invitation was extended by the Institute for Water Resources to the Corps planners who participated in the telephonic interviews (presented in Chapter II). This invitation offered design and facilitation services to be used by study managers for planning and conducting a meeting during their study process. Following several phone calls, two districts agreed to participate in the testing of the protocol trees. Each study manager was contacted by a member of the research team to discuss the goals of this report, answer any initial questions, and set the time for a conference call to test the protocol trees for designing meetings.

Each study manager was sent a draft copy of this report at least a week prior to the scheduled testing date. On the morning of the testing date, study managers were sent a fax memorandum (Appendix E) that outlined the agenda to be followed during the conference call. The results of each conference call were documented in after-action memoranda for preparation of this chapter.

Study Area I

The study manager for the first demonstration study was beginning a feasibility study for a large watershed near a major metropolitan area. A steering committee was being formed to assist with the development of the feasibility study. The goals of the first steering committee meeting, as described by the study manager, were to familiarize all the members with the Corps feasibility study process, explain the roles and responsibilities of the steering committee as they relate to the study, and identify data collection concerns. It was anticipated that there would be as many as twenty people serving on the committee to represent the city, the county, state resource agencies, residents of the study area, and any other organized public interests. The committee members will serve as liaisons between the committee and their respective organizations. Both the city and the county are acting as the local sponsors for this project.

Study Manager Comments

The study manager's initial comments regarding the draft report were very positive, citing the technique descriptions in Appendix C as being extremely helpful. The study manager also felt the report did a good job in identifying where Corps personnel could use assistance on public involvement and planning group meetings. Additionally, the protocol trees were seen as a good format for presenting group techniques for selection.

The research team asked the study manager to use the trees to identify techniques needed based on the described goals of the meeting. The study manager was asked to state what he was thinking when each question was read. The research team only provided clarification of a question in the protocol tree after initial comments were made by the study manager.

The first meeting goal the study manager identified was the need to familiarize steering committee members with the Corps feasibility study process. Moving to Figure III-1, he determined that the desired activity was the discussion of information, since he would present information about the study process and answer any questions. After being directed to Figure III-2 (the result of identifying discussion of information), the study manager answered no to the question, "Has the group identified their roles and responsibilities for the project?" This is because the group was meeting for the first time and their roles in the study would be defined during this discussion. This led to the recommendation of the Deployment Flowchart technique. Upon review of the description of the Deployment Flowchart technique in Appendix C, the study manager determined that the technique would be appropriate for presenting the feasibility study process.

The second meeting goal the study manager identified was to gather information from the steering committee regarding indicators of five major problem areas identified by the interagency project study team. The study manger recognized that this would require participants to generate possible indicators in addition to those that may be readily evident. Therefore, idea generation was the identified activity in Figure III-1. Moving to Figure III-3, the study manager determined that the answer to the question "Has a discussion technique been used with this group during this planning effort?" is yes. This is because the steering committee will have participated in the Deployment Flowchart activity prior to the generation of this new information. The study manager noted that the steering committee is not having difficulty conceptualizing the site because they are very familiar with the projects in the area as well as the problems that need to be addressed.

Moving down the right branch of the idea generation protocol tree, the study manager determined the answer to the question "Is the group concerned with generating the causes and effects of a problem?" was no. Although indicators of problems suggest examining cause-and-effect relationships, the goal is to compile a list of indicators. The group is not trying to make connections between causes and effects at this point in the study process. The study manager then determined that the answer to the question, "Are there group members that would dominate or withdraw in an open forum?" was yes. The study manager selected yes because although he is not aware of these tendencies in the committee members, there are some he has not met. Since this is the first meeting, the study manager wants all the members to share their ideas for improving the project. The study manager also wants them to recognize that they are part of the committee. He then determined that

the group needs to prioritize the information generated during the meeting to determine what indicators are of most importance to the committee members. This leads to the suggestion of Nominal Group Technique. After a review of the description of the technique in Appendix C, the study manager confirmed that this technique will be appropriate for the meeting format.

Design and Execution of Meeting

The study manager indicated that the meeting would last between two and three hours. In that time, the study manager would present steps to be followed for the study process and have the group identify the predominant problems in the basin. A meeting design document was created by the authors for use by the study manager. At the time of completion of this document, the district was still in the process of identifying a meeting date with the local sponsors of the project, and thus there was not an opportunity to implement the meeting design.

Study Area II

The study manager of the second demonstration study was formulating alternatives for a two-county ecosystem restoration feasibility study in a predominantly rural area. A steering committee was to meet for the second time in the feasibility study process. The goals of the meeting were to provide committee members with an update of the feasibility activities since the steering committee last met and to identify information that needs to be addressed at the next public meeting. It was anticipated that twenty people would attend this meeting, representing resource agencies, landowners, agricultural interests, and other organized publics. The committee members are not responsible for final project decisions. However, their recommendations will factor into the decisions on alternatives to be made by the project study team. The local sponsor is a state resource agency.

Study Manager Comments and Application of Protocol Trees

The study manager's initial comments supported the use of this type of tool for identifying group techniques. The protocol trees were identified as a valuable approach that would help planners develop meeting formats. Technique summaries in Appendix C were perceived as crisp, especially for those with figures providing examples. The study manager identified some questions within the protocol trees that required clarification, but generally found them useful.

The research team asked the study manager to use the trees to identify needed techniques based on the described goals of the meeting. The study manager was asked to state what he was thinking when each question was read. The research team only provided clarification of a question in the protocol tree after initial comments were made by the study manager.

The study manager indicated that discussion techniques would be most appropriate for this meeting. There were two meeting goals: provide an update of the feasibility study process and get feedback on preliminary management alternatives. It was determined that the update of the study process could be done with a straightforward presentation by the study manager using overhead slides. Questions could be answered as needed. For the second goal, the study manager determined the feedback regarding the preliminary management measures would require a discussion format. Moving to Figure III-2, the study manager determined that the group had identified their roles and responsibilities at the first steering committee meeting and that they were concerned with addressing cause-and-effect relationships. Answering the question "Are the causes and effects identified and understood by the group?" was difficult because the committee had representation comprised of technical (e.g., resource agency representatives) and non-technical (e.g., local Chamber of Commerce representatives) participating . The study manager chose to answer no to this question and the next that asks "Do the causes and effects need to generated by the group?" The cause-and-effect information was already developed by the interagency resource group. This led to the recommendation of either the Fishbone Diagram or the Tree Diagram techniques. A review of the technique descriptions in Appendix C by the study manager led him to question their appropriateness for this meeting. He looked up the descriptions of Attribute Association and the Is-Is Not Matrix techniques (located in the adjacent branch) in Appendix C, and also found those to be inappropriate because of the varied levels of technical expertise.

The study manager retraced the path of questions back to the question regarding the identification and understanding of causes and effects by the group. Representatives of the resource agencies might be able to assist in explaining the causes and effects to lay persons on the committee. Noting this change, he answered yes and received the suggestion to use the Force-Field Analysis technique. A review of its description in Appendix C was favorable, therefore the study manager determined it would be appropriate for the meeting.

Design and Execution of Meeting

The study manager indicated that the meeting would last approximately three hours. In that time, the study manager would provide an update of the feasibility study process to the steering committee members, review the preliminary management measures, and then solicit feedback on the measures. The development of the meeting design document indicated that there would be insufficient time to review the preliminary management measure and solicit feedback because there were eighteen that had to be considered.

The research team conducted another conference call with the study manager to determine if modifications could be made. Further discussion indicated that the responses from the committee members would be useful for determining the reaction of the public to the management measures, especially since their affiliations were better suited to the political aspects of the project. The research team suggested that additional ground could be covered if the steering committee generated a list of criteria that should be considered in the review of management measures. This list could be generated and tested against several management measures to verify what the steering committee considers

important for the project area. The study manager concurred, leading to another examination of the protocol trees.

Returning to the discussion protocol tree in Figure III-2, the study manager determined that the group (1) had identified their responsibilities for the project, (2) was not concerned with discussing cause-and-effect relationships, and (3) did not need to focus on information experts within the group. He answered no to the question "Would sketches created by the group be useful in discussing their perceptions of the problem?" because posters of the preliminary management measures were being prepared for this meeting and because there were too many measures to be addressed at the meeting. The final question "Are there group members who dominate or withdraw in an open forum?" was answered with a yes because several members of the committee tend to dominate discussions with their own particular interests in the study area. This led to the recommendation of the Nominal Group Technique. A review of the technique in Appendix C indicated that it would be appropriate for this meeting.

The final meeting design consisted of introductions, an update of the feasibility study, a review of the preliminary management measures, breakout groups to generate criteria, a test of the criteria, a review of the meeting's events and products, and the identification of future issues. The research team provided facilitators to conduct the meeting and execute the Nominal Group Technique. The chairperson of the steering committee was included in the final development of the meeting design document to ensure there would be no conflicts with the mission of the steering committee.

Sixteen steering committee members were present for the meeting. The introductions at the meeting were led by the lead facilitator, the chair of the steering committee, and the study manager. After introductions and clarification of the meeting purposes were complete, the study manager presented the update of the feasibility study process, indicating what had been done since the last time the steering committee met. Next, the study manager presented the preliminary management measures to the group, answering questions as they were asked by the steering committee. Following this activity, the lead facilitator explained to the committee that they would be divided into two groups to generate criteria that should be considered when the management measures are examined. Equal representation by organizations was sought in the formation of the two breakout groups.

Participants in the breakout groups were asked to silently generate criteria for the management measures, using the Nominal Group Technique. The facilitators solicited this information, writing it on flipchart paper and posting the sheets on the walls of the respective breakout rooms. Once all the information was posted, each criteria was clarified by the person who proposed it, and any identified redundancies were eliminated by the group. The participants prioritized the posted criteria, using three different colored dots to reflect their top three choices. The breakout group members discussed the results of the voting process and identified the top five criteria to present at the plenary session. A reporter was nominated for each breakout group to present a summary of their respective breakout group findings. After the groups reunited, commonality was sought among the criteria generated by the two groups, and the four primary criteria that resulted were used in an exercise that tested the criteria against one of the management measures. All of the criteria generated were included in an after-action memorandum for use by the study manager.

During the closing remarks of the meeting, the steering committee members were given evaluation forms to determine the effectiveness of the meeting format. Of the eleven surveys that were returned, only one indicated the meeting should have been conducted using some other format. The study manager noted the meeting accomplished its goals and noted that the criteria will be useful when the management measures are examined.

SUMMARY

The demonstration studies provide additional examples of how the protocol trees can be used. In the case of the second study, it illustrates how the trees can be used in conjunction with a facilitator to design and execute a meeting. The second study also exemplifies the need for flexibility in the use of the trees when the suggested technique seems inappropriate or there is a need to adjust to constraints (e.g., not enough time to review all eighteen management measures in conjunction with other meeting activities and a three hour time limit). It is important to recognize that time constraints (planning time for discussion/analysis, number of meeting agenda items) have a significant impact on the number of techniques that can be selected for use in a particular meeting. Overall, these demonstration studies illustrate that the trees can be used by Corps planners for ecosystem restoration projects and, with proper planning, can be used to develop activities for effective meeting formats.

CHAPTER V: CONCLUSIONS

This report has developed and tested a tool that Corps planners can use to improve communication among stakeholders involved in ecosystem restoration planning. The protocol trees direct the user to answer a series of questions for the purpose of suggesting an appropriate group technique to improve discussions, idea generation, or decision-making activities. The protocol trees were developed using input from Corps planners through from telephonic interviews and demonstration studies. Overall, the study managers who participated in the demonstration studies found the trees to be useful and, in the case of the second demonstration study, the protocol trees suggested a technique that led to a successful meeting.

Regardless of the desired meeting activity, these techniques encourage participation by the members of the group involved. The design of any meeting for groups involved in ecosystem restoration studies (e.g., steering committees, interagency teams) should focus on the purpose and desired outcomes of the meeting. Although participation is important, the group activities should provide useful results (e.g., improved understanding of tasks, information to be used later in the study). Adding techniques from the protocol trees solely for the sake of participation is not recommended. Techniques should be used to create and improve products, not to make participants feel good about being part of the group.

Throughout this report, there has been reference to the "suggestions" that the protocol trees offer. These suggestions are simply that, suggestions of what technique or techniques could be used based on answers to the questions within the trees. The questions are arranged based on general situations that occur in Corps ecosystem restoration planning. However, they do not account for all the factors that may affect how the meeting is designed, as illustrated by the second demonstration study. The second demonstration study provides a valuable example of why users need to be flexible in determining what group techniques could be used as part of their meeting design. As was shown, even though the suggested Force-Field Analysis technique would have been useful in examining the preliminary management measures, there was not enough time in the three hour meeting to adequately address all eighteen of them.

One other lesson that can be learned from the second demonstration study is the use of someone experienced in designing group meetings using group techniques. When it was determined that there would not be enough time to use the Force-Field Analysis technique, the research team (serving as the facilitation team) asked additional questions that surfaced another means of gathering information for evaluating the management measures. The value of an experienced facilitator, either in-house or external, can provide additional suggestions for making meeting designs more effective. In the case of the second demonstration study, the protocol trees suggested a technique the study manager found appropriate. However, the insight of the facilitation team suggested seeking the information in another form, taking them back to the trees to lead to the suggested (and later implemented) Nominal Group Technique.

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APPENDIX A

PARTICIPANT PREPARATION GUIDE FOR GROUP PROCESSES INTERVIEW

PARTICIPANT PREPARATION GUIDE FOR GROUP PROCESSES STUDY INTERVIEW

The Corps is currently involved in the development of methods and processes for assessing the efficiency and effectiveness of investments in ecosystem restoration, protection, and mitigation under the Evaluation of Environmental Investments Research Program (EEIRP). Some important questions that are being addressed in the EEIRP are: How are the developed data being communicated to the public, interest groups, sponsors and decision makers, and even other study team members? How are we using our expertise in this area? How can the views and values of differing publics, organizations, and institutions be considered? How do we incorporate trade-off analyses when we don't have a common measure for all outputs and costs, including opportunity costs? How do we address multiobjective planning?

The Evaluation Framework work unit is currently investigating group process techniques that could be incorporated into a general protocol for environmental project plan formulation. This includes identifying the current planning contexts where groups are involved, what types of information need to be communicated to whom, and where the greatest communication challenges exist.

As part of this analysis we are interviewing six to ten Corps planners who are involved with environmental projects. The objective of the interviews is to gain specific insights into the common group process challenges and opportunities faced by the Corps environmental planning community. The interview is designed to take no more than a half-hour. The question sequence is open-ended depending on the experience and answers provided by the respondent. The following is a sampling of the questions/topics that will be covered in the interview.

1) What are the common group situations that exist during the planning stages of environmental projects? (We are interested in the common junctures of a project when groups meet and what is done. This should include information about standard approaches, common stakeholders, and information needs.)

2) What are the common communication challenges that exist during the stages of environmental planning process? (The information for this question should identify trouble spots that exist in group meetings as well as times where group meetings could be used to improve communication/understanding in the planning context.)

3) What is your familiarity with group process techniques? (This question explores experiences the planner has had with group techniques, including participation in facilitated meetings and any training for the application of a particular technique. The information under this category is not restricted to environmental planning; any other contexts should be considered and described if applicable.)

We hope these questions/topics sufficiently prepare you for the interviews, and we look forward to hearing your responses to them. Thank you, in advance, for your participation in this research effort.

APPENDIX B

INTERVIEW QUESTIONNAIRE GUIDE

INTERVIEW GUIDE FOR IDENTIFYING COMMUNICATION CHALLENGES IN ECOSYSTEM RESTORATION PLANNING

This research effort is directed at identifying communication challenges that are common in the planning of ecosystem restoration projects. The information you provide us will assist in the creation of a tool that can be used by Corps planners to select group techniques for improving the results of group interaction. By group techniques, I mean structured approaches designed to improve communication and/or products developed by a group, such as the identification of environmental significance or the selection of alternatives for a project.

You have been contacted because of your involvement in planning ecosystem restoration projects. There are no right or wrong answers. Your experience is what is important here. These questions have been developed based on our knowledge of the environmental planning process. If there is something we don't address during this interview pertaining to group processes in ecosystem restoration planning, there will be an opportunity at the end for you to include it in your responses.

1) What are the common group situations that exist during the planning of ecosystem restoration projects?

2) Describe the standard approaches for gathering information from, and providing information to, stakeholders during plan formulation. (Note the distinction between information gathering and information providing). Are these approaches effective for gathering information from, and providing information to, stakeholders? Why?

3) Do you find that you or other stakeholders are not satisfied with the information, alternatives, or decisions that result from the planning effort? Why?

4) Describe the most challenging meeting, when it occurs in the planning process, who attends or is invited, and what the desired product is. Why is it the most challenging?

5) What types of information do you find particularly helpful/most needed? Is this information readily available, and if so, from whom?

6) In general, with which agencies and groups do you have good working relationships? Why are they good?

7) In general, with which agencies and groups do you have the most difficulty? What makes the interaction difficult?

8) What are the common communication challenges that exist during the environmental process?

9) Have you ever been a participant in any groups that used a structured process to improve communication? If so, what was used? Did you receive any training as a participant? How would you value its use in ecosystem restoration planning?

10) Have you ever been trained to lead or facilitate a structured group technique? If so, what was it? (Is there someone in your District trained for facilitation or executing group techniques?) How would you value its (their) usefulness for ecosystem restoration planning?

11) Are there any particular group techniques/processes that you would recommend as useful for improving ecosystem restoration planning?

12) Are there any other communication issues that have not been addressed in this interview that you would like to discuss?

APPENDIX C

GROUP TECHNIQUE PREPARATION AND TECHNIQUE DESCRIPTIONS

GROUP TECHNIQUE PREPARATION AND TECHNIQUE DESCRIPTIONS

This report has reviewed communication literature, cited needs of Corps environmental planners, and developed a protocol for the selection of group techniques to support ecosystem restoration planning. The purpose of this appendix is to identify considerations when preparing to use a group technique, provide a general overview of the technique categories by activity, and describe the techniques used in the protocol trees. Additional sources of information pertaining to the use of group techniques are listed at the end of this appendix.

PREPARATION

There are three vital components for preparing to use a group technique: identification of facilitation services, determination of how the meeting will be recorded, and modification of the technique to the situation. These preparations are discussed below.

Facilitation

The identification of facilitation services should be something that group members can agree upon prior to the meeting. If group members do not believe that a proposed facilitator is impartial, they may not participate fully during the meeting. In most cases, members of a group or their representative agencies would be inappropriate choices, especially when a group is meeting for the first time or when a major decision is going to be made. However, once the initial meeting is conducted, one or several members of the group could lead future meetings. If appropriate, responsibilities for leading could rotate among the entire group if the group met on a regular basis.

The role of the facilitator is to keep a group from deviating from the meeting format and process. Facilitators are generally not experts on the content of a meeting topic. Instead, they draw upon the expertise of the group, helping group members to focus on issues and information, not on each other. Their intention is not to force a change of behavior by participants but to provide information that allows participants to decide if they should change it.

A facilitator is partially responsible for the efficiency and effectiveness of the execution of the agenda and application of a group technique. This responsibility is to make sure the process and principles the group agrees to use are followed. A facilitator indicates that an action, such as making a decision when the initial group ground rules said they would not, violates the principles the group agreed upon at the beginning.

A facilitator should be aware of these components as well as the other criteria identified in Chapter III of this report. This should be evident as part of the development meeting between the facilitator and the planner. The primary interest the facilitator should have is the success of the group in following the process to develop a product, not in the type of product or content of information that results from the meeting. Although the facilitator may recognize there is a desired type of product, the facilitator should not influence the group toward seeking a particular type of information or solution in reaching that product.

Meeting Records

It is common practice to keep a record of meeting proceedings. It can be done simply with a note taker or more elaborately with a court stenographer or with audio/visual equipment. Regardless of how it is done, there is a certain amount of preparation required for the record to be of use to the participants.

One important aspect for a recorder's preparation is familiarity with the meeting agenda. This allows the recorder to prepare an outline prior to the meeting that will make note taking easier and provide better organization when the record is to be prepared for distribution. If there are slide presentations or other visual displays that will be used during the meeting, copies should be provided to the recorder for both record keeping purposes and inclusion in the meeting record.

The attribution of comments to meeting participants is another aspect of the recorder's preparation. If comments from participants require attribution in the record, the recorder needs to know the name of each person. This can be done with name tents or by providing the recorder with a "map" of the room that indicates where each participant is seated. The recorder should be in a position where he or she can read all name tents.

Another consideration regarding meeting records is their distribution. Participants may need copies not only for their records but also for future consideration at another session if it is required. It is important to complete the meeting record as soon as possible. In cases where a recorder was used instead of a stenographer, a period of review time by the meeting attendees should be considered before releasing the official meeting record. A week is typically enough time for participants to review the record and to send any comments.

It should be noted that meeting records, like facilitation services, can be done by a member or several members of the group, especially if they will be meeting on a regular basis. However, since group members have a vested interest in the outcome of the meeting, it is usually a good idea —especially during the initial meetings of a group—to have someone from outside the group serve as a recorder, since the recorder can be "lost" in discussion. If facilitation services are being used, the provider will usually include a recorder on the facilitation team.

Meeting Customization

Each group meeting should be customized to its particular situation. In doing so, there may be a need for combining several techniques, such as discussing information and making a decision or recommendation. Additionally, each group meeting has a particular context. Some meetings may address very sensitive issues that may require the facilitator to make some qualifying comments to appropriately set the stage. These modifications should be made in concert with the facilitator during the design of the meeting.

The use of group techniques typically requires the group to participate in a "warm-up" exercise, typically referred to as an icebreaker. An icebreaker may simply be a five-minute word-association exercise, or it can be an hour-long activity involving group members playing certain roles and participating in physical activities. These exercises are intended to reduce the likelihood of mental blocks occurring among the participants. Fogler and LeBlanc (1995) note that mental blocks can result due to problems with perception, emotion, culture, environment, intellect, or expressive ability. Additionally, it serves as a means for reducing stress and laying the groundwork for serious interaction later in the session. VanGundy (1987, 1992), Newstrom and Scannell (1996), and Fogler and LeBlanc offer a number of exercises that can be used to prepare the participants for group activities , especially for idea generation.

GROUP TECHNIQUE DESCRIPTIONS

This section presents a brief description of the techniques put forward for use in the protocol trees discussed in this report. Each technique is listed with the citation of the source in which it was found. Following the description, there is a general listing of the outputs that are associated with the use of the technique. Graphical representations are incorporated where possible for a clearer understanding of associated activities. These graphics are developed based on examples that could relate to ecosystem restoration projects.

Attribute Association --VanGundy, A. B. 1987. *Creative Problem Solving: A Guide for Trainers and Management.* Westport, CT: Quorum Books.

This technique can be used for improving physical objects or applying a concept with which the group is not familiar. The name of the object or concept is placed on a board where all participants can see it. Participants are asked to list all of the primary and secondary attributes associated with the object or concept. The attributes are posted down one side of a flipchart.

There are two options at this point. The first option is for the group to go into a facilitated discussion of possible modifications to the attributes. The second option is to have each participant take an attribute and do "free association" with it. Free association is using a word or phrase to stimulate another one. The new word or phrase is then used to stimulate another one. This process

continues until ideas are exhausted or until a set limit of words and/or phrases have been met. The words generated through free association are posted and examined by the group to see if they suggest any possible modifications that could be developed and/or implemented. An example of an attribute list is presented in Table C-1.

OUTPUT: List of Known Attributes; Improved Concept, Idea, or Alternative

TABLE C-1

ATTRIBUTE ASSOCIATION EXAMPLE

OBJECT:	Freshwater Wetland	
ATTRIBUTES:	Water	Fish
	Flows	Muskrat
	Sediment	Marsh Grasses
	Deadfalls	Filtration
	Floodwater Retention	Nutrient Cycling

Brainsketching --VanGundy, A. B. 1992. *Idea Power: Techniques and Resources to Unleash the Creativity in Your Organization.* New York, NY: American Management Association.

This technique is based on participants drawing their perception of how a problem could be solved. The facilitator asks the participants to create their drawing about how they perceive the problem and possible solutions on a sheet of paper. Once completed, the drawings are passed around the group, and other members add more sketches or comments to the original drawing. When the drawings have gone around the group, they are examined to select a solution based on one sketch or a combination from the parts of several drawings.

OUTPUT: Generated Ideas Based on Discussion of Drawings by Group Members

Brainstorming --VanGundy, A. B. 1992. *Idea Power: Techniques and Resources to Unleash the Creativity in Your Organization.* New York, NY: American Management Association.

Brainstorming is the primary process from which idea generation techniques evolved. It is not a random generation of thoughts as many individuals believe it to be. Brainstorming is the spontaneous generation of information, but there is a structured process that is used to maximize its output. The facilitator asks the participants to generate ideas or solutions to a problem. The participants are encouraged to make connections between their ideas and others in the group. The basis is verbal interaction among the participants, but the emphasis should be on idea generation, not

idea evaluation. This emphasis on idea generation is reinforced by the facilitator throughout the meeting. Many variations of brainstorming have been developed to prevent groups from being dominated by one member or from becoming so familiar with a technique that they end up "in a rut" where the information may not be fully examined. These variations include silently generating ideas on paper or conducting a meeting with group members via computer terminals.

OUTPUT: Generated Ideas and Alternatives

Brainwriting --Moore, C. M. 1987. *Group Techniques for Idea Building: Applied Social Research Methods, 2d ed.* Vol. 9. Newbury Park, CA: Sage.

Brainwriting is a more formalized approach to brainstorming in that all of the generation and improvement of ideas are conducted on paper. Participants are instructed to write approximately four ideas or suggestions on paper pertaining to the topic of discussion. All the papers are placed in the middle of a table and then randomly distributed among the participants. The participants then can improve upon the existing ideas by recommending changes, or can add new ideas to the list. These iterations occur several times during a session. The information is compiled for examination outside the group. The group can be brought together to review the compiled information. The advantage to this approach over brainstorming is that it prevents other members of the group from being influenced by someone who would dominate discussion in an open oral forum.

OUTPUT: Generated Ideas and Alternatives

Decision Matrix --Tague, N. 1995. *The Quality Toolbox.* Milwaukee, WI: ASQC Quality Press.

A Decision Matrix evaluates and prioritizes a list of choices that have been generated by a group. The facilitator asks the group to generate a list of criteria that are to be used in the evaluation. The group should evaluate the criteria that will be used to determine the most important, so that the list is no longer than six criteria. Next, the resulting criteria are weighted based on their importance, usually by distributing ten points among them. This weighting can be on an individual basis or by the group, if possible. Each choice is then evaluated on how it meets the criteria based on a three- or five- point rating scale (from high to low in efficiency and/or effectiveness). The rating of each choice is multiplied by the weighting of each criteria, and the totals of each criteria for a particular choice are added together. If each individual ranks the information, the numbers for each cell of the matrix should be added together. The choice with the highest score is not intended to be the final answer, but rather it should lead to additional discussion where the group can reach consensus. A sample Decision Matrix is shown in Figure C-1.

OUTPUT: Prioritized List of Alternatives Based on Perceived Importance of Decision Criteria

Criteria → / Alternatives ↓	Increase Salt Water Flows High = 5	Cost Medium = 3	Restore Vegetation Medium/Low = 2	
TIDAL GATES	Medium -- Dependent on tidal flow 2×5=10	High -- Only requires installation of two gates 3×3=9	Low -- Dependent on seed transport 1×2=2	21
PUMPS	High -- salt water will always reach impoundment 3×5=15	Low -- Expensive to install and maintain 1×3=3	Low -- Dependent on seed transport 1×2=2	20
CONSTRUCT CHANNEL	Low -- Dependent on tidal flow and maintenance 1×5=5	Low -- Expensive 1×3=3	Low -- Dependent on seed transport 1×2=2	10

FIGURE C-1

SAMPLE DECISION MATRIX

Deployment Flowchart --Tague, N. 1995. *The Quality Toolbox*. Milwaukee, WI: ASQC Quality Press.

This technique is used to illustrate what happens within a process and who performs tasks related to each step of the process. A flipchart, dry-erase board, or overhead projector is used to list all the players involved in the process. The facilitator leads the participants in brainstorming major steps of the process. These steps are placed in their appropriate position along a timeline or flowchart as shown in Figure C-2. The facilitator asks the participants to add steps for which they are responsible or a specific product they may need from a step. Post-It notes can be used to indicate what steps of the process have been added or what group members are responsible for executing if using a flipchart. The facilitator guides the group in a discussion of these steps to come to an agreement about who is responsible for completing what tasks.

OUTPUT: Diagram Representing Group Understanding of Responsibility for Task Execution and Resource Needs; Acceptance of Tasks

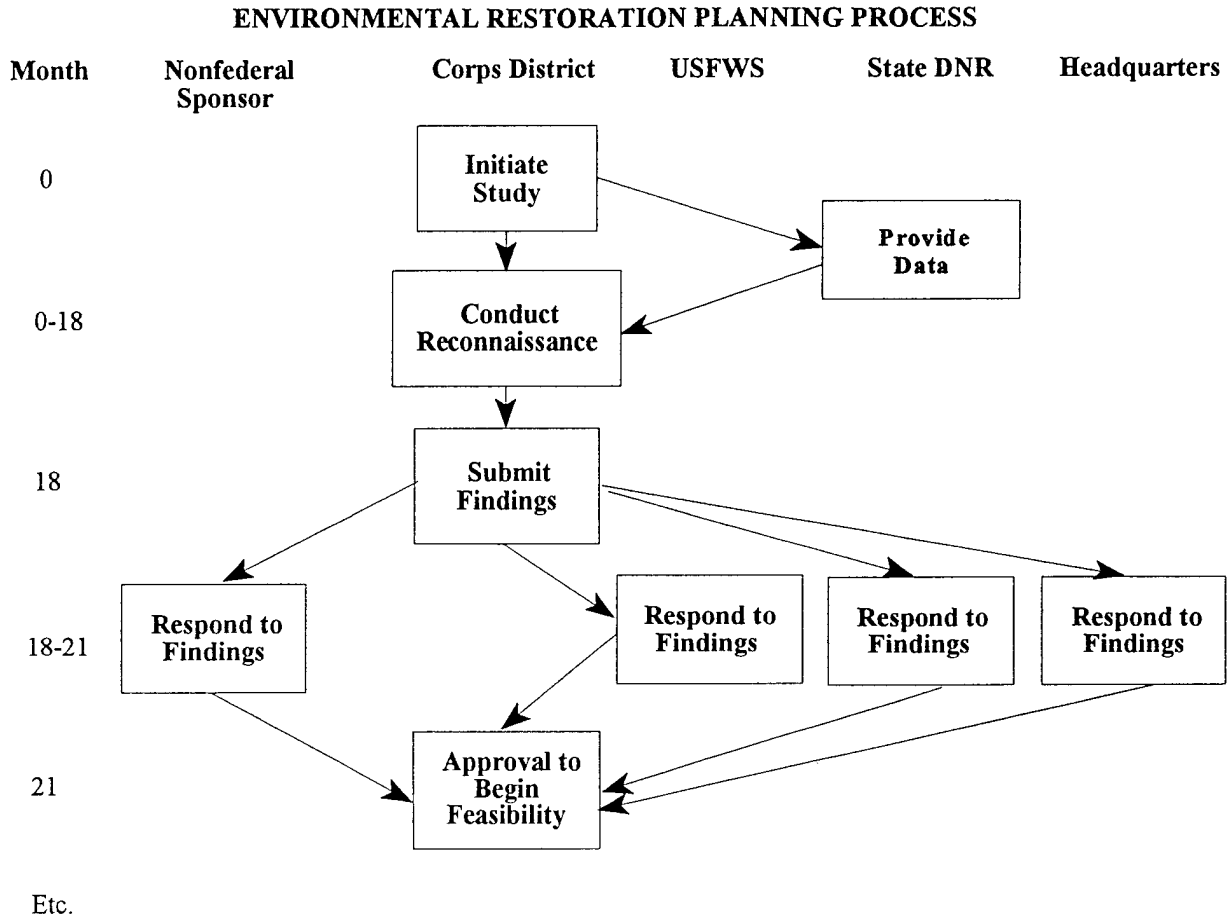

FIGURE C-2

SAMPLE DEPLOYMENT FLOWCHART (Adapted from Tague 1995)

Effective-Achievable Matrix –Tague, N. 1995. *The Quality Toolbox*. Milwaukee, WI: ASQC Quality Press.

This technique prioritizes potential choices based on their effectiveness and likelihood of achievement. Participants first determine the effectiveness of an alternative. The facilitator guides group discussion in determining if the alternative receives a high or low rating. Next, the likelihood of accomplishing the choice is evaluated, again using the high-low system. The results are put into a two-by-two matrix on a flowchart to identify how the choices rated under both criteria. Like the decision matrix, this is not intended to make the final decision but rather to inspire additional discussion that brings the group to consensus around a particular alternative. A sample of this matrix is shown in Figure C-3.

OUTPUT: Prioritization of Alternatives Based on Achievability and Effectiveness

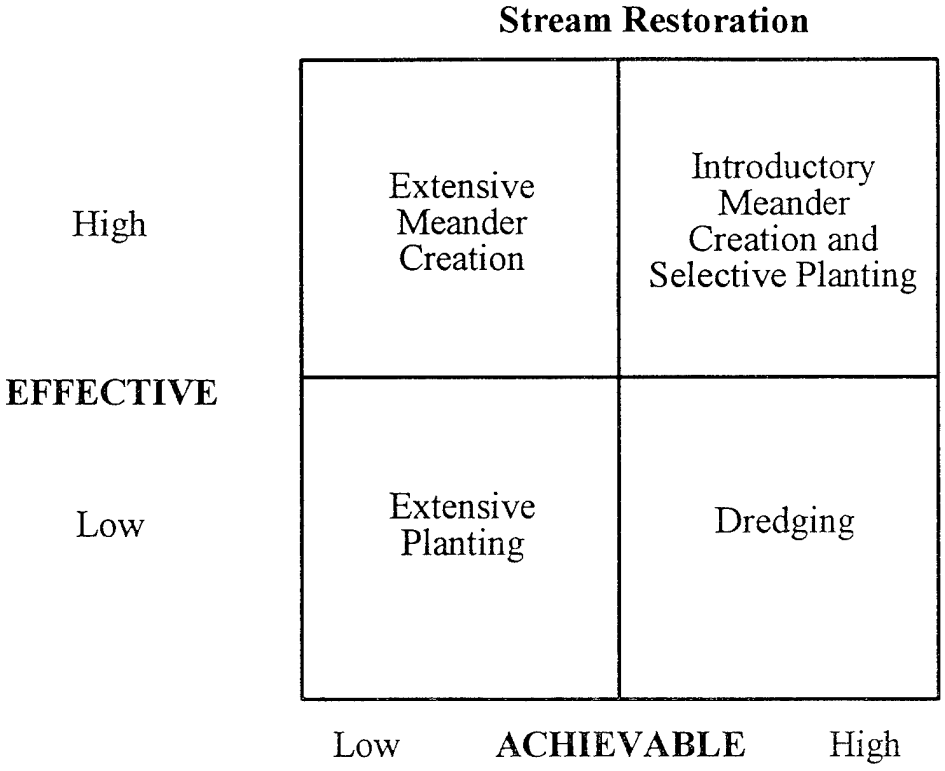

FIGURE C-3

SAMPLE EFFECTIVE-ACHIEVABLE MATRIX

Fishbone Diagram --Tague, N. 1995. *The Quality Toolbox*. Milwaukee, WI: ASQC Quality Press.

The Fishbone Diagram is a means for organizing or adding to generated information. It allows for broad thinking about a problem, preferably when attempting to determine a cause-and-effect relationship. The facilitator places the problem statement or issue in a box with a horizontal line coming out of it (usually on a flipchart or large dry-erase board). Major categories related to the issue (already generated) are listed as stems from the horizontal line by the facilitator to familiarize the participants with the information. Participants brainstorm information for each major category. This new information is placed as subcategories contributing to the major ones and attached to their respective major stems as shown in Figure C-4. These subcategories can receive additional information as another subcategory. There can be several iterations of this process if a subcategory is to be examined using this approach.

OUTPUT: Generated List of Potential Causes and Effects of a Problem

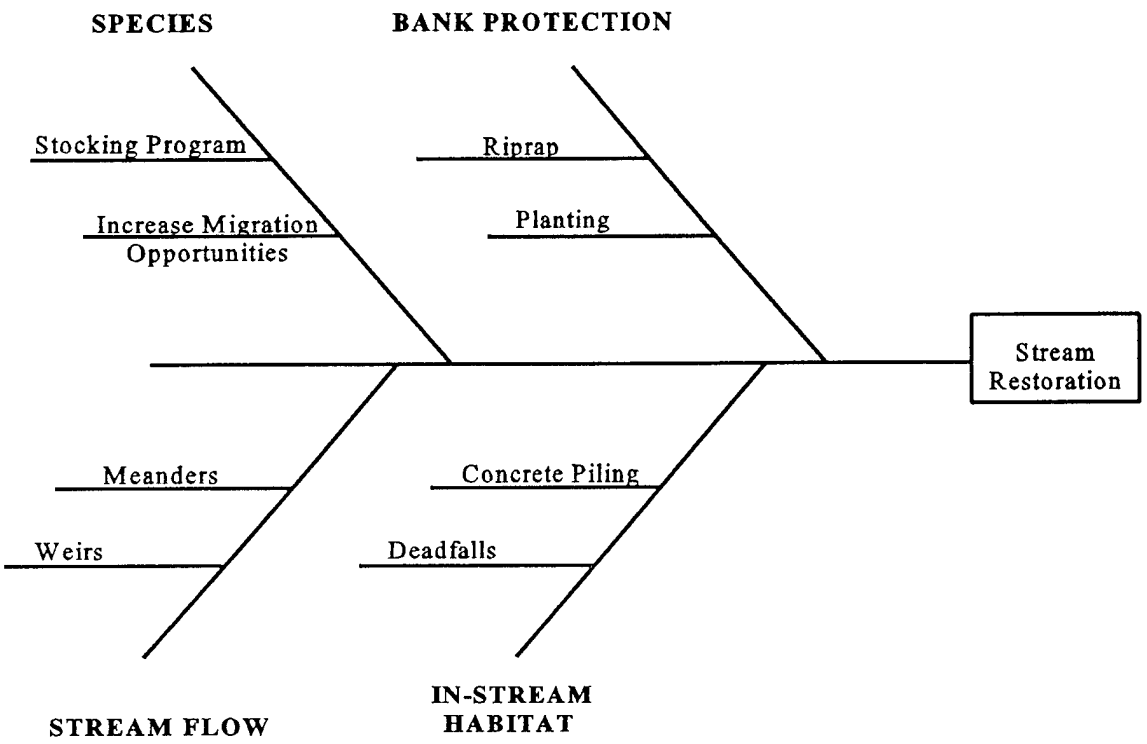

FIGURE C-4

SAMPLE FISHBONE DIAGRAM

Fishbowling --Moody, P. E. 1983. *Decision Making: Proven Methods for Better Decisions. New York, NY: McGraw-Hill.*

The basis of this technique is to focus on a single speaker during discussion of a problem or possible solution(s) to gather information. A circle of chairs is made with one chair in the center. Only the person in the center chair is allowed to respond to questions. In many cases, these people are experts in a particular subject area or are treated as such. Questions may be posed, one at a time to the person in the center chair, but no talking or declarative statements are allowed among the other members seated around the circle. When the person in the center chair is finished, he or she may be replaced with another member of the circle. The session ends when someone recommends ending the information session. The group votes on the motion, and if a majority of the participants agree to end it, the session is closed.

OUTPUT: Greater Collective Knowledge Base among Group Members

Focus Group --Tague, N. 1995. *The Quality Toolbox.* Milwaukee, WI: ASQC Quality Press.

Focus Groups allow for informal communication/discussion about a particular problem or the possible success of a particular approach. Normally, a group of individuals that are affected by a product or action are gathered together to discuss their perspectives. A facilitator is used to maintain communication among the participants, but he or she does not direct it. There is minimal structure in this technique to allow for more spontaneity from the participants. Usually, the topic of discussion is presented by the moderator, and then the floor is relinquished to the participants, with the moderator enforcing ground rules that have been violated and guiding participants to expand on comments directed at achieving the final goal. Flipcharts or dry-erase boards should be available if someone needs to create an illustration.

OUTPUT: Greater Collective Knowledge Base among Group Members

Force-Field Analysis --Tague, N. 1995. *The Quality Toolbox.* Milwaukee, WI: ASQC Quality Press.

Force-Field Analysis is used for examining an issue that has significant opposing aspects. The issue can be an alternative that could be implemented or a problem to be solved. First, the facilitator places the issue or problem on a flipchart. Next, the participants brainstorm a list of the positive forces that cause the option to occur. This information is listed down the left side of the flipchart. Next, all the negative forces that would prevent the option from occurring are generated and listed down the other side of the flipchart. A sample analysis is shown in Figure C-5. Assigning relative strengths of these forces is one option that may be useful for determining which are the most significant to address. After this, the facilitator leads the group through a consideration of the possible alternatives for reducing or eliminating the restraining forces. These alternatives are listed on a flipchart and posted for consideration and discussion.

OUTPUT: List of Causes and Effects of a Problem; List of Alternatives to Address Causes and Effects

Gallery Method --VanGundy, A. B. 1992. *Idea Power: Techniques and Resources to Unleash the Creativity in Your Organization.* New York, NY: American Management Association.

This approach is based on participants graphically drawing their perception of the problem and possible alternatives. This is done to stimulate discussion among the group about a particular issue. Participants are asked to make a picture of what they perceive to be a problem and/or solution regarding a particular issue. Each participant receives one flipchart page and some markers to create a drawing. The drawings are hung on a wall, similar to an art gallery display. The participants individually examine each "picture," taking notes based on what they see. The group reassembles to write down any new ideas or improvements on those seen during this tour. These suggestions are

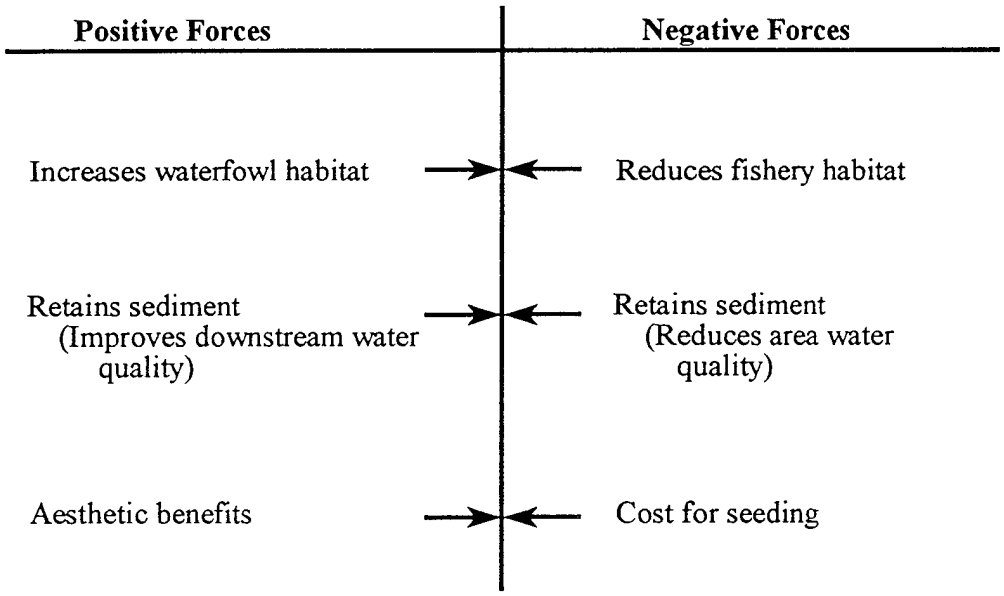

FIGURE C-5

SAMPLE FORCE-FIELD ANALYSIS

listed on a flipchart and considered for selection. It is similar to Brainsketching described above except that the participants do not alter the drawings of the group members.

OUTPUT: Greater Collective Knowledge Base among Group Participants; Generated List of Ideas

Interpretive Structural Modeling (ISM) --Moore, C. M. 1987. *Group Techniques for Idea Building: Applied Social Research Methods, 2d ed.* Vol. 9. Newbury Park, CA: Sage.

ISM is used to identify and summarize relationships among items that define an issue or problem. The group is asked to compare two items at a time to produce a rank-order list of the items being discussed based on a subordinate relationship. The phrasing of the comparison is essential to the success of this approach. A facilitator is used to moderate the discussion of the comparisons being made, and an observer is used to record notes from the discussion. A computer program has been developed for applying ISM because of the amount of information that is generated.

OUTPUT: Prioritized Listing of Alternatives or Options

Is-Is Not Matrix --Tague, N. 1995. *The Quality Toolbox.* Milwaukee, WI: ASQC Quality Press.

The Is-Is Not Matrix identifies causes of problems and identifies patterns in a situation. Participants are asked by the facilitator to identify the header components for the columns and rows of the matrix. The columns of the matrix relate to what is likely to happen, what is not likely to happen, and any distinctions between the two. The rows relate to the who, what, where, when, and extent of the problem. The participants generate information for each box of the matrix. Next, the facilitator goes around the table asking each member for a component to be placed in a box. The participants determine if the information should be added. Examination of the information in the boxes is used to look for links to the actual problem. The matrix is intended to identify causes of a problem or situation, not to attribute blame. A sample matrix is shown in Figure C-6.

OUTPUT: List of Causes and Effects of a Problem

Multivoting --Tague, N. 1995. *The Quality Toolbox.* Milwaukee, WI: ASQC Quality Press.

Multivoting is used to narrow a large list of items. In this approach, the facilitator presents a list of items to be considered for ranking that are labeled either numerically or alphabetically. The number of votes each participant is given for this list is usually equal to one-third of the total items being considered. Once the votes have been counted, items with the fewest votes are eliminated. The votes cast can be weighted to reflect each member's rank-ordered preference. This procedure can be executed several times until a predetermined goal is reached (e.g., reduce the initial list to five alternatives, create a rank-order that identifies the three predominant problems in the basin). The group should discuss whether the options they have selected are appropriate and not simply rely on the totals generated from the vote.

OUTPUT: Prioritized Listing of Alternatives

Nominal Group Technique --Moore, C. M. 1987. *Group Techniques for Idea Building: Applied Social Research Methods, 2d ed.* Vol. 9. Newbury Park, CA: Sage.

Nominal Group Technique is a tool that incorporates idea generation, discussion, and decision making. This approach is typically used for a group that requires extensive structure or contains members that may be in conflict. Normally, the facilitator asks the participants to silently brainstorm information regarding a particular topic. This information is posted on a board or wall using flipcharts. Participants may ask for definitions of the information posted, but no one is allowed to challenge the information that is generated. The participants, assisted by the facilitator, then group the information according to similarities, where possible. After this, the participants use a voting procedure, such as multivoting, to develop a list of rank priorities. Like Brainstorming, this

	Is Describe what does occur.	**Is not** Describe what does not occur, though it reasonably might.	**Distinctions** What stands out as odd?
What objects are affected? What occurs?	Heavy siltation to fish and waterfowl habitat in the middle third of drainage basin.	Lower third is unaffected.	
Where does the problem occur? • Geographical • Physical • On an object	Middle third of drainage basin.	Lower third of drainage basin.	Lower third is unaffected.
When does the problem occur? When first? When since? How long? What patterns? Before, during, after other events?	Has become prominent in the last five years.	Is not flushing out like normal.	
Extent of problem How many problems? How many objects or situations have problems? How serious is the problem?	Less diversity of fish. Diminished waterfowl population.		
Who is involved? (Do not use this question to blame.) To whom, by whom, near whom does this occur?	Farms, Dam Operators		No change in water manipulation

FIGURE C-6

SAMPLE IS-IS NOT MATRIX

technique allows for the incorporation of any variations that are feasible for meeting the goals of the group.

OUTPUT: Greater Collective Knowledge Base among Group Members; List of Ideas and Alternatives; and Recommended Decision

Tree Diagram --Tague, N. 1995. *The Quality Toolbox*. Milwaukee, WI: ASQC Quality Press.

The Tree Diagram is used to move thinking from general ideas to specific actions in a logical manner, often for identifying the cause of a problem (how or why) or creating a solution. Additionally, this provides information to stakeholders about tasks that may occur during the planning process. This differs from the Deployment Flowchart discussed above because Tree Diagrams use several iterations of brainstorming to identify options for a particular branch. Ideas for solving problems are brainstormed and posted. Information indicating how the proposed solutions are implemented is brainstormed by the participants. The facilitator posts the information in relation to each solution it supports. This process undergoes several iterations until all identified actions are listed. Once this is done, the participants examine the alternatives to determine if they are necessary and sufficient for accomplishing the task or identifying the problem. A sample Tree Diagram is shown in Figure C-7.

OUTPUT: Diagram Identifying Causes and Effects of a Problem

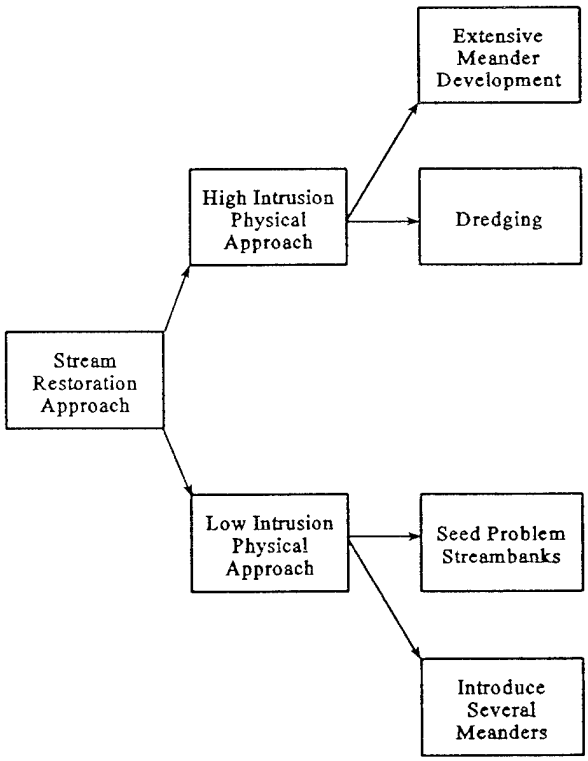

FIGURE C-7

SAMPLE TREE DIAGRAM OF STREAM RESTORATION APPROACH

ADDITIONAL SOURCES

This report provides basic descriptions of a sample representation of group techniques. Some sources that provide additional techniques and more detailed descriptions are listed below. Also, information pertaining to the Corps Alternative Dispute Resolution Program and its associated series of publications can be attained by contacting:

Dr. Jerome Delli Priscoli
Institute for Water Resources
Casey Building
Alexandria, VA 22060-5586
Telephone: (703) 428-6372

Albrecht, K. 1980. *Brain Power: Learn to Improve Your Thinking Skills.* New York, NY: Prentice Hall Press.

Dunning, M. 1986. *Collaborative Problem Solving for Installation Planning and Decision Making.* Alexandria, VA: U.S. Army Corps of Engineers Institute for Water Resources.

Fogler, H. S. and S. E. LeBlanc. 1995. *Strategies for Creative Problem Solving.* Englewood Cliffs, NJ: Prentice Hall PTR.

Fox, W. M. 1987. *Effective Group Problem Solving: How to Broaden Participation, Improve Decision Making, and Increase Commitment to Action.* San Francisco, CA: Jossey-Bass.

Kelly, P. K. 1994. *Team Decision-Making Techniques: A Practical Guide to Successful Team Outcomes.* Irvine, CA: Richard Chang Associates, Inc.

Moody, P. E. 1983. *Decision Making: Proven Methods for Better Decisions.* New York, NY: McGraw-Hill.

Moore, C. M. 1987. *Group Techniques for Idea Building.* Newbury Park, CA: Sage.

Newstrom, J. W., and E. E. Scannell. 1996. *The Big Book of Business Games: Icebreakers, Creativity Exercises, and Meeting Energizers.* New York, NY: McGraw-Hill.

Schwarz, R. M. 1994. *The Skilled Facilitator: Practical Wisdom for Developing Effective Groups.* San Francisco, CA: Jossey-Bass.

Tague, N. 1995. *The Quality Toolbox.* Milwaukee, WI: ASQC Quality Press.

VanGundy, A.B. 1987. *Creative Problem Solving: A Guide for Trainers and Managers.* Westport, CT: Quorum.

_____. 1987. *Creative Problem Solving: A Guide for Trainers and Management.* Westport, CT: Quorum Books.

APPENDIX D

LIST OF CANDIDATE GROUP TECHNIQUES

TABLE D-1

CLASSIFICATION OF GROUP TECHNIQUES BY ACTIVITY

Discussion	Idea Generation	Decision Making
Affinity Diagram	Analogies/Metaphors	3-2-1 Voting
Attribute Association	Attribute Association	Alternation Ranking Technique
Consensus Thinking	Brainsketching	Decision-Analysis
Delphi	Brainstorming	Decision Matrix
Deployment Flowchart	Brainstorming Revisited	Didactic Interaction
Duncker Diagram	Brainwriting	Effective-Achievable Matrix
Exploring the Problem	Cause-and-Effect Diagram	Interpretive Structural Modeling
Fishbone Diagram	Cause Enumeration Diagram	List Reduction
Fishbowling	Coca-Cola	Modeling
Flowchart	Collective Notebook	Multivoting
Focus Group	Consultant for a Minute	Problem Matrix
Force-Field Analysis	Crawford Slip Writing	Prioritizing Grid
Gallery Method	Creative Problem Solving	Screening
How-How Diagram	Cross-Fertilization	Situation Analysis
Is-Is Not Matrix	Desired Result Fishbone	Social Participatory Allocative Network
Nominal Group Technique	Duncker Diagram	Solution Matrix
PERT Modeling	Force-Fit Game	Stepladder Technique
Present State/Desired State	Futuring	Synergistic Decision Making
Process Flow Diagram	Gordon/Little	Weighted Voting
Requirements and Measures Tree	Greeting Cards	
Service Map	Ideawriting	
Standard Agenda	Ishikawa Diagram	
Statement-Restatement	Method 6-3-5	
Top-Down Flowchart	Osborn's Checklist	
Tree Diagram	Other People's Views	
Why-Why Diagram	Pack Up Your Troubles...	
Work-Flow Diagram	Phillips 66	
	Picture Stimulation	
	Pin Cards	
	Random Stimulation	
	Relational Algorithms	
	Reversals	
	Semantic Initiation	
	Sociodrama	
	Standard Agenda	
	Statement-Restatement	
	Super Heroes	
	The Mind Is a Wonderful Thing	
	Trigger Method	
	Visual Synectics	
	We're All Wealthy!	
	What If?	
	Wildest Idea	

APPENDIX E

PRE-CONFERENCE CALL MEMORANDUM

FAX COVER SHEET

To: Corps Planner Company: District Office, U.S. Army Corps of Engineers

Number of pages, including cover sheet: 1 Date: August/September 1996

FAX: (xxx) xxx-xxxx Phone: (xxx) xxx-xxxx

□ Urgent □ For Review □ Please Reply □ For Your Information

Re: Conference Call Today

We wanted to provide you with an agenda for our conference call for today. This will allow us to maximize our time spent in developing the meeting and reviewing the utility of the protocol trees. The general agenda will be as follows.

Review Purpose of Call--To identify a meeting design for the steering committee and verify the utility of the protocol trees.

General Review of Report--Your initial thoughts and discussion.

Discussion of Steering Committee Components--What are the goals of the steering committee? Who will be involved? Will the meeting require the participants to do extensive "heavy duty" thinking?

Two Run-Throughs of Trees--The first run-through will be your leading us through your understanding of the questions. The second will be our going through it together, clarifying any questions that may arise.

Outline a General Understanding of the Meeting Design--Verifying that we both understand what the meeting format and goals will be.

Identify Next Steps--Discussion of schedule for design document, meeting, etc.

The call is scheduled for 12:30 p.m. EST. If any adjustments of the time or the agenda are needed, please contact the research team at (xxx) xxx-xxxx. Otherwise, expect our call at 12:30. Thank you.